THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND, Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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"THE ENGINEERING AND MINING JOURNAL" ADVOCATES THE ADOPTION OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES,

and urges all who are interested in the simplification of our present complicated and unsatisfactory systems to aid, by their active sympathy and encouragement, the early introduction of this much-needed reform.

THE INSTITUTE AND THE "IRON AGE."

THE MILK IN THE COCOANUT.

In March, 1876, the *Iron Age* said:

"The American Institute of Mining Engineers is now entering upon its fifth year, strong in membership, in influence and in the promise of a great and successful future. There was a time when we feared its usefulness would be impaired by the attempt to make it too comprehensive as regards the scope of its work; but it has had the advantage of good management from the first, and is now doing a work of national importance in giving us an American literature of metallurgy."

In March, 1877, the *Iron Age* charges that the management of the Institute has been from the beginning in the interest of the ENGINEERING AND MINING JOURNAL; that its "original purpose" was, and is, "the support of its organ"; that the efforts of the *Iron Age* "to present even intelligible abstracts" of its proceedings have been "opposed at every step"; that the "proprietors of the organ carry the Institute in their breeches pockets"; that "there is a growing feeling of dissatisfaction, of which the management may be ignorant, but which cannot long be suppressed"; and that "if the management do not meet this growing discontent by the adoption of a more liberal and intelligent policy the association will go to pieces!"

Certainly something must have happened between March, 1876, and March, 1877, to sour the milk in the cocoanut of the *Iron Age*. Was the *Iron Age* "opposed at every step" when in March, 1876, it printed sixteen columns of the proceedings of the Washington meeting, including the remarks of one of the editors of this paper, written out by him as a favor to Mr. WEEKS? Or was it "opposed" when in July and August it printed fifteen columns of the Philadelphia proceedings, not counting Mr. BELL'S paper? Evidently the presence and acidity of the lacteal deposit referred to must be otherwise accounted for. And the explanation lies, as might be supposed, in a nut-shell.

The *Iron Age* offered, as it had a perfect right to do, to take the place of the ENGINEERING AND MINING JOURNAL in publishing the papers and proceedings of the Institute. This offer was unanimously declined by the Council, on the ground that the present arrangement was satisfactory. The representative of the *Iron Age* then proceeded (although a member of the Institute and entirely aware of the rules adopted under what the *Iron Age* had been pleased to call "good management from the first") to evade those rules and to secure by "journalistic enterprise," in opposition to the Council, and in violation of a clear understanding personally acknowledged by him, the "advance publication" of papers from copies surreptitiously obtained. Whereupon in October, 1876, the Council very properly declined to lend him any longer, as had been the invariable custom up to that time, the papers of which he desired to "make abstracts."

At the last session of the recent meeting, and at the last moment of the session, the representative of the *Iron Age* offered a resolution permitting the representatives of all respectable journals to make copies or abstracts, in whole or in part, before official publication, of such papers as they might choose. This would be not only in violation of the present arrangement, but also preposterously impracticable in the eyes of all who consider accuracy more important than enterprise in the publication of scientific essays. Mr. WEEKS, in describing how he employed six copyists, with whom he was unacquainted, to hurry up a transcript of Mr. BELL'S paper, so as to get ahead of the official and correct publication of it by the Institute, confirmed with fatal clearness what the appearance of that paper in the *Iron Age* had already shown—the necessary result of turning loose upon professional essays a lot of journalists whose notions of science stop with the primary idea of "energy." After that unconscious suicide on his part, the resolution was lost by a unanimous vote.

The views of the *Iron Age* thereupon underwent the surprising change we have noted. There seems to be an occult connection between sour grapes and sour milk. As for the "growing dissatisfaction" of members generally, we trust they will make it known in more legitimate ways than by flinging at the management, through the newspapers, charges concerning which they are absolutely dumb in the meetings. No doubt the representative of the *Iron Age* is discontented, and will communicate this feeling to as many members as he can influence. From present appearances, however, we judge that when the Institute "goes to pieces," as he predicts, Mr. WEEKS will enjoy the distinguished honor of constituting one of the pieces, and the remainder of the members will constitute the other.

We venture to suggest to the *Iron Age* that the small personal question of the misbehavior of its representative ought not to warp its judgment of the Institute; and we appeal on this point from the *Iron Age* sour, in March 1877, to the *Iron Age* sweet, in March 1876.

THE ENGINEERING AND MINING JOURNAL receives for publishing the papers, proceedings and bulletins of the Institute no pecuniary compensation whatever. It furnishes copies to members at a large discount from its regular rates; and its gross receipts from this source amount to a very small percentage of its annual expenses. It is plain that the Institute "supports" this paper in the same sense as it "opposes" the *Iron Age*.

This journal having been chosen to print the full papers and proceedings, the necessity of requiring, as a general rule, their first publication here, is obvious to everybody but a Bohemian journalist. The papers are seldom completely ready for publication when they are read. They are not published by us until the Publishing Committee, with the aid of the authors, has carefully prepared them, procured the engravings, and ordered their publication. After that, they may be copied by other journals, without extraordinary danger of mistakes. A deliberate sacrifice of time is made to secure accuracy; and the whole process, from first to last, is under the complete control of the Publishing Committee. But, on the other hand, we could not undertake to publish all papers in full, and according to the wishes of that Committee, if other journals were meanwhile permitted to select at will whatever was most interesting, and give it to the public in advance. The correct official version ought manifestly, in the interest of the authors, to be the first that appears in full; and the officially designated journal has, in the absence of other compensation, the right to ask this as a part of its bargain.

The *Iron Age* seems to comprehend this dimly, and says the Institute ought to follow the example of other societies, which publish their papers in advance, and send them around. This is a very different proposition from that which its representative urged the other day; and we beg leave to point out that this is very nearly what the Institute now does. The papers are correctly printed in the ENGINEERING AND MINING JOURNAL, and "given to all journals desiring them." That this is done *after*, and not *before* the meeting, is a difference which experience has shown to be necessary. The other system is found to be nearly impracticable for a society so scattered in its membership. It is more expensive; it diminishes the number of papers and the attendance at meetings; and it reduces the sessions of such societies to a series of cut-and-dried proceedings, lacking the freshness of *extempore* debate. The *Iron Age* will permit us to believe that the acknowledged success of the Institute hitherto is to some extent the result of the plan on which it is conducted. An essential part of that plan is the non-publication of papers in advance.

But since the *Iron Age* asserts that only a small and select circle sees the papers as published in our columns, what is to hinder it from taking them from us? It is cheaper than to hire "six copyists" (and then print them wrong), or to try to shoot them on the wing with a stenographer, and not get them at all. And it is certainly wiser than to undertake to break the Institute into pieces—at least, *such* pieces!

One further observation, of a somewhat personal nature, we feel called upon to make. The article of the *Iron Age* contains the following:

"That the accomplished proprietors of the organ are influential in the management of the Institute is not to be wondered at. We are not surprised that they have warm personal friends among the members, who would make many sacrifices to promote their interests. That they have an axe to grind, is nothing to their discredit; *and it is perfectly proper that they should grind it.*"

The clause we have italicised indicates that in charging the proprietors of this journal with abusing, for their private advantage, the trust confided to them as officers of the Institute by their fellow-members, the *Iron Age* is not aware that it imputes dishonor to them. It is placidly unconscious that the charge is an insult—and where no offence is intended, we shall take none. But we beg to say distinctly that we should consider it utterly and infamously wrong to do the thing which the *Iron Age* declares to be "perfectly proper"; and that its code of ethics, if practiced or defended by a member of the Institute, would call for his immediate expulsion. *

THE TELEPHONE FOR MINE-SIGNALING.

Probably the most wonderful discovery of this fruitful age is that of the telephone, or sound-transmitting telegraph. It has now been demonstrated that the intonations of the human voice can be transmitted to almost any distance, and we are henceforth to talk by telegraph. About a year ago we noticed in the ENGINEERING AND MINING JOURNAL Mr. BELL'S discovery, but it has since been perfected, till it is not only possible to transmit a simple sound, but we have it announced in the New York papers that an enterprising impres-

sario has secured the exclusive use of the invention for transmitting concert music, and we are shortly to listen here to a concert taking place in Philadelphia.

The effect which this wonderful discovery will have upon the transaction of business, upon travelling (for if we can carry on a private conversation with our agents at distant points, it may often obviate the necessity for a journey thither); its influence on general education by practically multiplying the instructive capacity of man, and a thousand other applications by which civilization will be advanced, are too extensive themes to receive our attention at this time. If a lecturer, or an orator, or a singer, can be heard at a dozen distant places at the same time, it is difficult to imagine the advantages which will accrue to the world at large. Small towns which cannot afford to secure the expensive services of talented artists or distinguished lecturers can now, at a moderate cost, secure the same advantages as the large cities.

We desire, however, at present to call the attention of mine-owners to this wonderful instrument as a means of signaling in the mines. A telegraph wire can be laid through the mine, and with telephones at a few important stations, conversation can be carried on between those in different parts of the mine and those on the surface. Should an accident occur, the prompt notification of it and its nature might save many lives and much property; and the possibility of conversing freely between distant points without the necessity of skilled operators will unquestionably prove an incalculable advantage in mining, as it will be in other departments of industry.

The following description, which we take from *Engineering*, and the illustrations, show how exceedingly simple is this wonderful instrument:

The transmitting instrument which is represented in Fig. 1 consists of a horizontal electro-magnet attached to a pillar about 3 inches above a horizontal mahogany stand. In front of the poles of this magnet—or, more correctly speaking, magneto-electric inductor—is fixed to the stand in a vertical plane a circular brass ring, over which is stretched a membrane, carrying at its center a small oblong piece of soft iron, which plays in front of the inductor magnet whenever the membrane is in a state of vibration. This membrane can be tightened like a drum by the three mill-headed screws shown in the figure. The ends of the coil surrounding the magnet terminate in two binding screws by which the instrument is put in circuit with the receiving instrument, which is shown in Fig. 2. This instrument is nothing more than one of the tubular electro-magnets invented by M. Nicles in the year 1852, but which has been re-invented under various fancy names several times since. It consists of a vertical bar electro-magnet enclosed in a tube of soft iron, by which its magnetic field is condensed and its attractive power within that area increased. Over this is fixed, attached by a screw at a point near its circumference, a thin sheet-iron armature of the thickness of a sheet of cartridge paper, and this, when under the influence of the transmitted currents, acts partly as a vibrator and partly as a resonator. The magnet with its armature is mounted on a little bridge which is attached to a mahogany stand similar to that of the transmitting instrument.

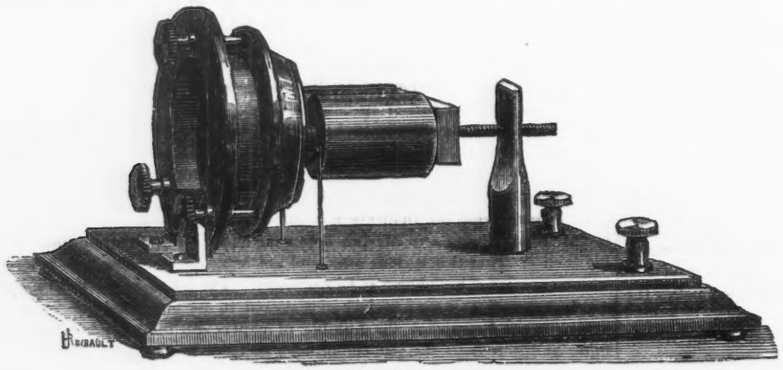


FIG. 1.

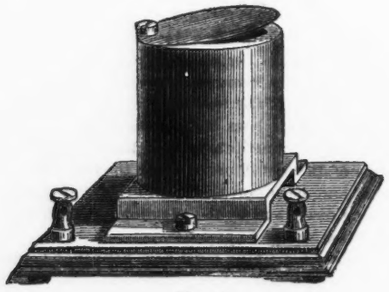


FIG. 2.

The action of the apparatus is as follows: When a note or a word is sounded into the mouthpiece of the transmitter, its membrane vibrates in unison with the sound, and in doing so carries the soft iron inductor attached to it backwards and forwards in presence of the electro-magnet, inducing a series of magneto-electric currents in its surrounding helix, which are transmitted by the conducting wire to the receiving instrument, and a corresponding vibration is therefore set up in the thin iron armature sufficient to produce sonorous vibrations by which articulated words can be distinctly and clearly recognized.

In all previous attempts at producing this result, the vibrations were produced by a make-and-break arrangement, so that while the number of vibrations per second as well as the time measures were correctly transmitted, there was no variation in the strength of the current, whereby the quality of tone was also recorded. This defect did not prevent the transmission of pure musical notes, nor even the discord produced by a mixture of them, but the complicated variations of tone, of quality, and of modulation which make up the human voice, required something more than a mere isocronism of vibratory impulses.

In Mr. Bell's apparatus not only are the vibrations in the receiving instrument isochronous with those of the transmitting membrane, but they are at the same time similar in quality to the sound producing them, for the currents being induced by an inductor vibrating with the voice, differences of amplitude of vibrations cause differences in strength of the impulses, and the articulate sound as of a person speaking is produced at the other end.

This, the greatest by far of all the marvels of the electric telegraph, is due to Mr. Graham Bell, of Edinburgh, and Montreal, and Boston, now becoming a naturalized citizen of the United States. Who can but admire the hardihood of invention which devised such very slight means to realize the mathematical conception that, if electricity is to convey all the delicacies of quality which distinguish articulate speech, the strength of its current must vary continuously and as nearly as may be in simple proportion to the velocity of a particle of air engaged in constituting the sound.

We are told that "Mr. GRAY is now at work on an instrument designed to make every tone print a letter. If 'A' is sent, 'A' will be printed at the receiving end. Analysis of sound is the governing principle. When completed, these printers will supersede the commercial instruments now in use, since they will be much more rapid and available for long lines."

NEW PUBLICATIONS.

ANNUAL REPORT OF PROGRESS AND RESULTS OF THE WISCONSIN GEOLOGICAL SURVEY FOR THE YEAR 1876. By T. C. CHAMBERLIN, Chief Geologist. Madison, Wis., 1877.

This pamphlet of forty pages is probably the last annual report of the Wisconsin survey that will appear before the publication of the final report, in two volumes, now in preparation. The survey has accomplished much for science and for the economic interests of the State. It has pointed out the existence and determined the quality of many building stones and ceramic materials; it has found limestone within the State to take the place in iron smelting of that now imported from Ohio; above all, it has traced across Northwestern Wisconsin the copper-bearing rocks of the Michigan peninsula, and to some extent the iron ranges also. The galena-bearing crevices of the Wisconsin lead region have not been surveyed since WHITNEY'S examination of them in 1860. For the sake of the light which might be obtained in these three departments only—copper, iron and lead—this survey ought to go on; and in that sense we regret to hear of any "final report." But the hints and promises given in this pamphlet of the nature of Volume II. of that report predispose us greatly in its favor. Volume I., it appears, is to be a kind of popular hand-book, devoted to preparing the citizens to understand the other. As this is the arrangement dictated by the law, we shall forbear to criticise the geological corps for giving up so large a part of the work to elementary material which is easily accessible to citizens in other and probably more convenient forms. We note that Mr. CHARLES E. WRIGHT, formerly an assistant of Major BROOKS, has taken the place of the latter in continuing the work in the Menomonee iron region; but Major BROOKS will furnish the report on that region. Prof. R. D. IRVING'S brief summary of the geology of the central and northern part of the State gives compactly the result of much intelligent labor.

BOOKS RECENTLY RECEIVED.

The following publications have recently been received, and several of them will receive further notice hereafter:

GRAPHICAL ANALYSIS OF ROOF TRUSSES. By CHAS. E. GREENE. A.M., Prof. of Civil Engineering, University of Michigan. Illustrated. Published by GEORGE H. FROST, Chicago. 1876.

ACOUSTICS, LIGHT AND HEAT. By WILLIAM LEES, M.A. Illustrated. G. P. PUTNAM'S SONS, New York. 75c.

THEORETICAL MECHANICS. An Elementary Handbook. Illustrated. By WILLIAM ROSSITER, F.R.A.S., F.C.S., F.R.G.S. G. P. PUTNAM'S SONS, New York. 75c.

TESTING AND WORKING SILVER ORES. By CHAS. H. AARON. DEWEY & Co., San Francisco. 114 pp.; $2.00.

FORMULÆ FOR THE CALCULATION OF RAILROAD EXCAVATION AND EMBANKMENT. By JOHN WOODBRIDGE DAVIS, C.E. G. S. ROBERTS, E. M., School of Mines, Columbia College, New York. Paper, $1; cloth, $1.50; 88 pp.

BUREAU OF STATISTICS OF LABOR OF MASSACHUSETTS. Seventh Annual Report. Edited by CARROLL D. WRIGHT, Chief of Bureau of Statistics of Labor. Boston, 1876.

THIRD ANNUAL REPORT OF THE STATE MINE INSPECTOR OF OHIO (ANDREW ROY, Esq.,) FOR 1876. Columbus, Ohio, 1876. 196 pp.

BERG-UND HÜTTEN-KALENDER for 1877. BAEDEKER, Essen.

RAILWAYS OF NEW SOUTH WALES. Report of their Construction and Working from 1872 to 1875 inclusive. By JOHN RAE, A.M., Commissioner for Railways. JOHN WILEY & SONS, New York. With maps. 128 pp.

AN ESSAY ON NEW SOUTH WALES. By G. H. REID, author of "Five Free Trade Essays." JOHN WILEY & SONS, New York. 146 pp.

REPORT OF THE DEPARTMENT OF MINES, NOVA SCOTIA, FOR 1876. By HENRY S. POOLE, F.G.S., Inspector of Mines. Halifax, N.S.

REPORT ON THE GEOLOGICAL MAP OF MASSACHUSETTS. By W. O. CROSBY and Prof. ALPHEUS HYATT, Boston Society of Natural History. Boston, 1876.

REPORT OF THE BOARD OF COMMISSIONERS OF THE NEW YORK STATE SURVEY. JAMES T. GARDNER, Director of the State Survey. Albany, 1877.

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS. Edited by JAMES FORREST, Secretary.——CENTRIFUGAL PUMPS. By Hon. R. CLERE PARSONS, B.A., B.C.E., Dublin.——CHALK WATER SYSTEM. By JOSEPH LUCAS.——TESTING OF PORTLAND CEMENT. By ISAAC JOHN MANN.——ABSTRACTS OF PAPERS IN FOREIGN TRANSACTIONS AND PERIODICALS. Parts 1 & 4.

A TEXTBOOK OF MINERALOGY. With an Extended Treatise on Crystallography and Physical Mineralogy. By EDWARD SALISBURY DANA and Prof. JAMES D. DANA. JOHN WILEY & SONS, New York. Illustrated. 485 pp.; price $5.

TWICE DEFEATED. LIPPINCOTT & Co., Phila.

MOLLY MAGUIRES. By a Member of the Schuylkill County Bar. LIPPINCOTT & Co. Philadelphia.

ON BOILER INCRUSTATION AND CORROSION. By F. J. ROWAN. D. VAN NOSTRAND, New York. 18mo, 88 pp. Price 50c. 1876.

PRACTICAL TREATISE OF THE PROPERTIES OF CONTINUOUS BRIDGES. By CHAS. BENDER, C.E. D. VAN NOSTRAND, New York. 18mo, 150 pp. Price 50c.

THE GODERICH SALT REGION.*

By T. Sterry Hunt, LL.D., F.R.S.

The deposit of rock salt which is known to exist along the eastern shore of Lake Huron, in the province of Ontario, has lately been more completely explored than before, by a boring with a diamond drill, put down by Henry Attrill, Esq., of New York city, and the results obtained are so important in every way that I make no apology for presenting them to the Institute of Mining Engineers. I may be permitted to preface an account of this remarkable exploration and of its results with a historical sketch of the discovery and development of this salt region.

It was in December 1865 that a boring was begun near the town of Goderich, in the hope of finding petroleum. In this the adventurers were disappointed, but, after passing through about 800 ft. of limestone, they encountered a series of variegated marls, in which, at a depth of 964 ft. from the surface, a bed of rock-salt, thirty feet in thickness, was met with in May, 1866. The boring was carried to a depth of 1,010 feet, ending in hard rock, and yielded, by pumping, a very pure saturated brine, when examined by me in August of the same year. In the report of the Geological Survey of Canada for 1863–66, published early in 1867, I described this well, with many geological details, and gave an analysis of the brine.

In the next three years a considerable number of wells were sunk in and around Goderich, and numerous trials were made in various other parts of the region. Salt was found at Kincardine, thirty miles north-northeast from Goderich, at a depth of about 900 feet, and also at Clinton, thirteen miles southeast, at 1,180 feet. Records of these wells, with analyses of the brine from them, were given by myself in a subsequent report of the Geological Survey, 1866–69, published in 1870 (pp. 211–244), together with accounts of various unsuccessful borings in the neighborhood, analyses of the brines from the various wells, (including one analysis by Dr. Goessmann), together with many details of the salt-manufacture at Goderich, at Syracuse, N. Y., and at Saginaw, Mich. The geological character of the region was there discussed at length, and it was shown that the salt here occurs in the Onondaga or Salina formation, which is also the source of the Syracuse, though not of the Saginaw brines.

Since that date some farther discoveries have been made in this region. At Kingstone's Mills in Warwick, about fifty miles a little west of south from Goderich, a boring, begun for oil in the black shale at the summit of the Hamilton formation, was carried down 1,200 feet, when salt was met with, which was found alternating with marls and harder beds for 130 feet, beneath which 70 feet of hard rock were penetrated, making 1,400 feet in all. From this well a very pure and saturated brine was raised, which was analysed by me, and the well described in 1870.

The observations from that date to the end of 1874 are to be found in the report of Mr. J. Lionel Smith to the director of the Geological Survey of Canada, dated November, 1874, and published in 1876. Rock salt had been found at Port Frank in Bosanquet, a little to the north of Warwick, and also, at a depth of 1,100 feet, in an oil-well in the township of Dawn, south of Enniskillen. Another well had been sunk at Kincardine to a depth of 1,007 feet (being 110 feet below the previous boring), from which it appeared that beneath 12 feet of rock salt, and 36 feet of alternating marls and salt, was another bed of 60 feet of pure salt. Similar results had been obtained at Goderich, where in the International well were found, in descending order—salt, 19 feet; rock, 30 feet; salt, 24 feet; rock, 3½ feet; salt, 32 feet; rock, 8 feet; the boring ending at 1,170½ feet. Besides the wells at Kincardine, Goderich and Clinton, salt had also been met with at Seaforth, about thirty miles southeast of Goderich, where it was found at 1,035 feet. The boring was carried 100 feet farther, and, according to Mr. Smith, a third layer of salt was reached here, as at Goderich. At Carronbrook, five miles farther to the southeast, a well sunk 1,396 feet showed no salt, and at Mitchell, eleven miles southeast from Seaforth, a boring was carried down 2,008 feet. No salt was there met with, and after passing through the Onondaga marls and the underlying Niagara limestone, the boring was carried 300 feet in the red shales of the Medina formation,

At Inverhuron, on the lake shore, nine miles north of Kincardine, marls but slightly impregnated with salt were met with at 895 feet, and the boring was abundant in hard limestone at 1,007 feet. At Teeswater, some twenty miles farther to the eastward, a well was bored to 1,180 feet, traversing somewhat saliferous strata, but no rock salt; and similar negative results were obtained by a boring of 1,200 foet at Ainsleyville, about fifteen miles north of Seaforth. These observations serve to show the limit, to the north and east, of the salt-deposit. It occupies but a small area in the great extent of the Onondaga formation, which underlies and bounds on two sides the shallow basin of Corniferous limestone through which the borings of Teeswater, Ainsleyville and Mitchell have been sunk. To the southward, however, the same salt-deposit, or perhaps a distinct one, would appear to have a considerable extension.

In 1873 Mr. J. Gibson published in the *American Journal of Science* an account of this salt-region, which he subsequently embodied in a communication to a Committee of the Canadian House of Commons in 1876. His account is little more than an unacknowledged compilation from my official report of 1869, together with records from the borings of some of the newer wells just mentioned, and some curious errors on the part of its author.

The brines obtained from the various wells of Goderich, Clinton, Seaforth and Kincardine are, as appear from my analyses, of great strength, varying from 90° to 100° of the salometer (the latter degree indicating saturation), and hold a much smaller proportion of earthy chlorids than those of either Saginaw or Syracuse. The manufacture of salt by artificial heat is carried on at all these Canadian wells, and in 1873, according to the data obtained by Mr. Smith, the production from them was over two and one-third million bushels, of which very nearly one-half was sent to the United States, notwithstanding an import duty of 34 cents per barrel, and 8 cents per 100 pounds of salt in bulk; making $1.60 per ton of 2,000 pounds, or very nearly 4½ cents for the bushel, estimated at fifty-six pounds.

The Canadian demand for salt is limited, while that of the United States is large and rapidly increasing. This country imports large quantities of salt from the West Indies, Southern Europe and Great Britain, the latter country sending us 6,000,000 bushels in 1872. The interior States are, however, in great part supplied from local sources. The total salt-production of the country, according to the census of 1870, was equal to nearly 18,000,000 bushels, of which more than 17,000,000 bushels were made from the brines of New York. Michigan, Ohio, Pennsylvania and West Virginia. I am not in possession of authentic dates since that time; in Michigan, however, the salt manufacture has greatly increased, the production having risen from a little less than 4,000,000 bushels in 1870 to 7,313,645 bushels in 1876.

Impressed with the great future offered by the interior salt-market of the United States, Mr. Attrill resolved to ascertain whether this vast deposit of rock-salt in the Goderich region was of a nature to be advantageously extracted by mining. Having acquired a large tract of land on the lake shore, commanding the port of Goderich and affording the necessary facilities for shipment, he proceeded, by the aid of a diamond drill, to determine the nature of the salt-beds beneath. This work was begun and successfully completed in the course of the year 1876. Previous to its completion, however, in September last, Mr. Attrill consulted me professionally in the matter and placed in my hands the whole of the results of the operation, for study, analysis and description. The principal results of my inquiries were embodied by me in a letter published in *The Globe* of Toronto, on the 9th of January, 1877, and I am now indebted to the generous courtesy of Mr. Attrill for permission to lay the details of the whole operation and the results of my studies before the Institute of Mining Engineers.

Having previously been furnished with a copy of the record or log of the well, I received on the 14th of November a selection from the cores extracted, to the depth of 1,295 feet, and, on the 16th of December, those from the continuation of the boring down, to the point at which it was abandoned, 1,517 feet from the surface. The cores were sent me from Goderich to Boston, and on each occasion I was visited by Mr. W. S. Fritz, of Pottsville, Penn., the very intelligent and skillful foreman of the drilling, who carefully went over the collection of cores with me, and gave many verbal explanations, besides leaving with me the diary of the operations from the beginning. The work was commenced at Goderich, on the 10th of March, 1876, by sinking a well through gravel and clay to a depth of 35 feet, after which a wrought-iron pipe was driven 10 feet farther. The annular diamond drill was then used for about 10 feet more, passing through what is described as "a broken sandy rock," yielding but a few inches of core. Below this a gravel bed was reached, through which iron pipe was again driven to a depth of 59 feet. Drilling was once more resorted to, and after passing through what seemed to be boulders or loose masses of limestone to a depth of 72 feet, a stratum of sand and gravel, with some clay, was reached, through which iron pipe was again driven until, at a depth of 78 9-12 feet, what was regarded as the bed-rock was reached on the 15th of April. The record up to this point is as follows:

	Feet.	Inches.
Gravel	14	0
Blue clay	31	0
Loose stones, or boulders	10	0
Gravel	4	0
Loose stones as before	13	0
Sand and clay	6	9
Total of superficial deposits	78	9

For the next 15 feet boring was effected partly by a steel drill and partly by the diamond drill, passing through what was described as a porous limestone. From this portion only two feet of core were obtained. Beyond this the drilling proceeded regularly with an annular diamond drill of two and a half inches diameter up to July 10th, when a depth of 349 feet had been reached. From the 270 feet of solid rock thus bored, only 103 feet of cores were extracted. At this point the work was interrupted from the loss of tools in the bore-hole. It was, however, resumed on the 20th July, this time under the direction of Mr. W. S. Fritz, who, after extracting the tools, recommenced the boring on the 10th of August. An influx of water was perceived, it is said, at 135 feet, and another and more considerable one having been met with at about 360 feet, an iron pipe of 2⅞ inches was driven down to a depth of 365 feet, thus excluding the water.

Below this point the boring was made with a two-inch annular diamond drill, and was carried on without any interruption (except the loss of a week from the breaking of a drum of the lifting-machinery) up to the 6th December, when the work was stopped at a depth of 1,517 feet from the surface, making a distance of little over 1,438 feet drilled in the solid rock.

Up to 349 feet, we have seen that the cores preserved measured only 103 feet, but for the succeeding 936 feet, or to a depth of 1,295 feet, reached on the 10th November, there were extracted 853 7-12 feet of cores. From this point to the bottom, a distance of 222 feet, there were obtained, according to the record, only 98 feet of cores, which were in an exceedingly soft and crumbling state. Of this distance the last 125 feet (below the lowest salt-bed) yielded only about 23 feet of core, the average day's boring, of about ten feet, here giving, in many cases, only one or two feet of solid core, and in one instance none at all, the whole portion removed breaking up into a soft incoherent mud.

Of the cores down to the vicinity of the salt-bearing rock, or to 910 feet from the surface, I received only a selection of fragments from one to six inches in length, each duly labelled; and, in addition to these, portions of the clay, gravel and boulders. I had for the 830 feet of solid rock, ninety-three specimens, measuring in all about thirty feet, judiciously chosen with a view to give examples of every variety of rock met with in this part of the boring. Below 910 feet the whole of the cores extracted, amounting, for the 617

*A paper read before the American Institute of Mining Engineers, at the New York meeting, February, 1877.

ft. penetrated, to 443 ft. in length, were sent me, arranged and labelled, in twelve boxes. These materials were, at the request of Mr. Attrill, submitted to a careful chemical and mineralogical investigation, in order to determine whatever might be either of economic or scientific importance. The results of the examinations already made are embodied in the present communication.

The salt-bearing strata at Goderich, as will be shown in the sequel, are nearly horizontal, so that the measurements given below may be taken as representing the actual thickness of the beds traversed. The entire rock-section shown in the cores from the boring may be conveniently described in seventeen divisions, as follows :

BORING BY MR. ATTRILL AT GODERICH, ONTARIO.

	Feet. In.	Total Feet. In.
I. Clay, gravel and boulders	78 9	78 9
II. Dolomite, with thin limestone layers	278 3	357 0
III. Limestone, with corals, chert and beds of dolomite	276 0	633 0
IV. Dolomite, with seams of gypsum	243 0	876 0
V. Variegated marls, with beds of dolomite	121 0	997 0
VI. ROCK SALT; 1st bed	30 11	1027 11
VII. Dolomite, with marls towards the base	32 1	1060 0
VIII. ROCK SALT; 2d bed	25 4	1085 4
IX. Dolomite	6 10	1092 2
X. ROCK SALT; 3d bed	34 10	1127 0
XI. Marls, with dolomite and anhydrite	80 7	1207 7
XII. ROCK SALT; 4th bed	15 5	1223 0
XIII. Dolomite and anhydrite	7 0	1230 0
XIV. ROCK SALT; 5th bed	13 6	1243 6
XV. Marls, soft, with anhydrite	135 6	1379 0
XVI. ROCK SALT; 6th bed	6 0	1385 0
XVII. Marls, soft, with dolomite and anhydrite	132 0	1517 0

I now proceed to describe, in descending order, as numbered, the several divisions of the section. Passing over I, which consists of the superficial deposits already noticed, we come to

DIVISION II. This, extending from 78 ft. 9 in. to 357 ft., consists almost wholly of dolomite or magnesian limestone, varying in color from pale gray and buff to dark gray, passing into chocolate-brown. This latter color is due to a little bitumen, the odor of which is very marked in the specimens. These dolomites are in some parts fine-grained and compact, and in other parts coarsely granular and crystalline. In many beds, the cut surface of the compact rock, as seen in the cores, is marked with numerous small round shallow pits from one to two-tenths of an inch in diameter, apparently formed by the dissolving out of some substance. These give the rock a worm-eaten aspect, which led the late Prof. Eaton to call similar beds, belonging to the same geological horizon in the State of New York, *vermicular lime-rock*. In other beds the surface of the cores is marked from the removal, by solution, of thinbladed crystals, which has given rise to what appear like small gashes, or incisions in the compact rock. These are sometimes half an inch in length, and occasionally intersect each other at right angles. Some portions of the rock are porous or cellular throughout, and in other parts the mass is made up of thin curved or waved laminæ, alternating of lighter and darker colors.

The compact vermicular rock was met with in several specimens from between 100 and 150 feet; that with thin-bladed crystals between 260 and 300 feet, and the finely laminated variety at 189 feet; while from this to 217 feet, the specimens were coarsely granular and often cellular. The chocolate-colored bituminous beds were from 320 to 351 feet. These various rocks scarcely effervesced with an acid, unless previously crushed to powder, and were evidently proper dolomites. Layers of a more calcareous rock, effervescing like a true limestone, were, however, detected between 93 and 102 feet, and between 181 and 183 feet.

TO BE CONTINUED.

THE LEAD AND SILVER WORKS OF THE MECHERNICH MINING COMPANY.

(*Concluded from Page* 137.)

The desilvering of the crude lead by zinc takes place in the ordinary way by the stirring in of zinc, cooling of the lead bath, and skimming off the different crusts until the remaining lead is free from silver. The kettles now used contain 18 to 20 tons of lead. The zinc is added in two instead of three portions, the first addition being 0·90 per cent. of the weight of the lead, the second 0·13 per cent, in all 1·07 per cent. of the weight of the lead; and even this small amount has been reduced to 0·97 per cent. by the use of the zinc scum from the second skimmings of a previous kettle, instead of pure zinc for the first addition. After the skimming, the lead containing only 0·0005 per cent. to 0·0006 per cent. silver=0·15 oz. per ton of 2,000 lb., is refined by means of steam.

These works are different from most of the German refining works, and to advantage, in that they have the kettles arranged in steps, so that the lead flows from one to the other instead of being ladled; also in that the refining kettles into which the steam is admitted are solidly imbedded in masonry, and heated from the top instead of from the bottom, in the usual manner. There are four desilverizing kettles situated on the highest level, from which the poor lead flows into the refining kettles, one to each two of the desilverizing kettles, through a pipe furnished with a valve.

These refining kettles are, more properly speaking, reverberatory furnaces, with kettle-shaped hearths; they empty themselves in the same manner as the desilverizing kettles into the casting kettles, from which the market lead is poured into moulds.

In the above described apparatus are worked 40 tons of lead each 24 hours, which amount could, without increasing the number or size of the kettles, be increased to 55 tons; thus, in January, 1875, in 21 working days, 1,150 tons of lead were produced. The zinc and antimony dust which collects on the surface of the lead during the refining is, together with the skimmings from the crude lead (before the addition of the zinc), smelted in a two-tuyere shaft furnace, and the lead produced goes to the desilverizing kettles again; but in this second working the dust and skimmings accumulating in the refining are reserved until enough is accumulated to make a campaign, especially for hard lead.

Below are given some analyses of different kinds of lead produced.

No. 1, crude lead direct from ore smelting; No. 2, market lead from No 1; No. 3, also market lead from No. 1; No. 4, lead produced from 1st skimmings and from dust from the refining kettles; No 5, hard lead produced from No. 4.

	No. 1. Per cent.	No. 2. Per cent.	No. 3, Per cent.	No. 4. Per cent.	No. 5. Per cent.
Silver	·0260	·00050	·00040	·0125	·00050
Copper	·1136	·00123	·00093	·3400	·00108
Bismuth	.....	.....	.....	.....	.....
Antimony	·0801	·00194	·00208	·7128	·00306
Iron	·0022	·00102	·00082	·0028	·00110
Zinc	.....	·00080	·00040	.....	·00060
Nickel	·0028	.....	.....	·0130	.....
Total impurity	0·2247	0·00549	0·00463	1·0811	0·00634

Although nickel exists in the crude lead and in No 4, not the least trace is to be found in the market lead or the hard lead.

The zinc crusts taken from the surface of the lead are melted in the upper of two kettles (furnished with a pipe and valve at its bottom), from which the resulting lead, containing 200 grms. per ton (5·32 oz. per ton of 2,000 lb.) in silver flows into the lower kettle, and from there is returned again to the desilverizing kettles. The resulting rich skimmings, of which an analysis is given below, amounting to 1½ per cent. of the crude lead, are worked in shaft-furnaces with the following additions :

For each 100 parts zinc skimmings.
" " 30 " iron puddle slag.
" " 50 " same slag.*

150 to 200 parts lead matte.
50 parts coke.

ANALYSIS OF ZINC SKIMMINGS.

Lead	48·30 per cent.	Antimony	·36 per cent.
Zinc	39·00 " "	Iron	1·28 " "
Copper	5·33 " "	Arsenic	trace.
Silver	1·22 " "	Nickel	"

The furnace used is of the crucible form, 11 feet in length from tuyeres to feed-hole, and 3 feet 4 inches in diameter, with three tuyeres and a pressure of blast of 3-10 inches mercury. From this smelting, the slag containing 2 to 3 per cent. lead, and about 2 oz. per ton silver, is returned to the crude lead smelting, while the matte produced containing 10 to 12 per cent. copper, 10 per cent. lead, and 3,000 to 4,000 grammes silver per ton of lead (8 to 10·5 oz. troy per ton of 2,000 lb. of matte) is twice smelted in the raw state, with the addition of 50 per cent of some plumbiferous product poor in silver.

By means of these three smeltings the original matte produced in the crude lead, smelting is reduced to one-twelfth its original weight, and results in a copper matte with 25 to 30 per cent copper, 10 per cent. lead, 2 to 3 per cent. nickel, and 8 to 10·5 oz. silver, per ton of matte, which is sold without further treatment.

The rich lead, with 2·5 to 3 per cent. silver, is cupelled in English cupel-furnaces, with admission of an air-blast. The resulting litharge, containing about 10 oz. per ton in silver, is reduced to lead and again desilverized; while the silver ("blichsilber," ·950 to ·980 fine) is refined in black-lead crucibles, with the addition of bone ash, until it is ·998 to ·999 fine.

The loss in silver in smelting the rich scums or crusts is very small. The yearly cleaning out of the condensation chambers expressly belonging to this department (86 meters in length and containing 150 square meters surface), yielded only 15,846 kilogrammes of dust, containing 30·8 per cent. lead and 497 grammes silver per ton of lead (3·97 ozs. per ton of 2,000 lb. of dust), this calculated on the entire quantity of silver produced, viz.: 3,152 kilogrammes amount to only 0·07 per cent. The workmen employed in the refinery are paid according to the amount of market lead produced; those employed at the shaft furnace in the smelting of the antimony dust or the rich zinc crusts by the day. These smelting works have a very extensive system of condensation chambers, from which in 1874 1,357·6 tons of dust, yielding on an average 61 per cent. of lead and 1·49 troy ozs. per ton of fume. The production in 1874 consisted of 1,531·7 tons of lead, 101,350·3 ozs of silver and 475 tons of copper matte. The average number of men employed is 250 to 270.

In the above, which is nearly a literal translation from a paper by Mr. H. Jäger, the metallurgist in charge of the smelting works, no mention is made of the lead containing by-products (such as litharge, sweepings, etc.) on hand at the beginning and end of the year. Supposing the amount of lead and silver in them to be approximately the same at each period, we may compute the total loss indicated by the dry assay in smelting and separating for the year 1874. For convenience the weights of lead and silver are given in tons of 2,000 lb. and troy ounces.

There were smelted in 1874 from the

Bachrevier	21,250	tons ore	containing	12,771	tons lead	and 63,112	ozs. silver
Western part	3,652	" "		1,052·6	" "	13,147·7	"
Purchased ore	2,595	" "		1,790·5	" "	34,513·5	"
Tailings	1,126	" "		214	" "	1,419·4	"
Total	28,623			15,828·8		112,192·0	
Produced in same time				15,331·7	" "	103,350·3	"
Contained in 47·5 tons copper matte with 10 per cent. lead and 10 ozs. silver per ton				4·7		474·7	
Total production				15,336·4	" "	101,825	"
Total loss				491·7	" "	10,367·6	"

Loss in percentage of the total amount of metal contained in the ore—lead 31-100ths of one per cent.; silver 92-100ths of one per cent.

This result is indicative of very close work, and of a treatment on the whole thorough and economical. It is to be observed, however, that owing to the invariable loss of lead in the dry assay of the ore the real loss in lead is much greater than that given above. This view is also upheld by a comparison of the respective losses in lead and silver: the loss in the former should be considerably greater under ordinary circumstances than that of the latter, instead of one-third of it, as indicated by the figures. If we suppose that the two slag samples of which the analyses are given above represent fairly the average slag produced from the shaft-furnace, the indicated loss in lead in the slag produced in the crude lead smelter would be about three per cent. of the total lead contents, to which would have to be added the loss by volatilization in blast furnace and the losses in the roasting and separating. The real loss of lead therefore is probably from 3 to 4 per cent. of the total lead contained in the ore. The smelting and separating works are situated under very favorable conditions of level, etc., about one-third of a mile from the Bachrevier.

SOME GENERAL DETAILS.

Between the smelting works and the Bachrevier are situated the carpenters,

* Slag from same operation.

blacksmiths and machine construction and repair shops, with the offices of the same. The completeness of the whole establishment may be judged by the fact that these construction and repair shops include several heating furnaces with the steam hammer necessary to utilize the scrap wrought iron produced. There is also a fire-brick factory and a foundry belonging to the company.

All these different works are connected with one another and with the Rhine Railway by a completely equipped broad-gauge steam railway, the entire length of which is 20 kilometers (12½ miles). There is also telegraphic communication between all the bureaus and the principal bureau at Mechernich.

In the mines, smelting works and workshops were in operation in the year 1875 :

35 steam boilers of 1,900 square meters, 20,463 square feet heating surface, and 1,200 horse power.

31 steam-engines of together 1,479 horse power, including 4 pumping engines with their different lift and force pumps raising water from a depth of from 36 to 100 meters.

8 locomotives of usual gauge for transporting ore and material to and from the terminus of the Rhine Railway and between the different works.

3 locomotives of narrower gauge for the transportation of ore and waste in the quarry and underground to the hoisting shafts.

46 machine tools, such as lathes, planers, circular and upright saws, etc., in the construction and repair shops.

The company own 176 dwellings for the workmen and officers, and employ on an average 3,000 workmen.

The dressed ore produced from the Bachrevier in 1875 amounted to 22,380 tons, containing 60 per cent. lead. When we consider that this ore was dressed or concentrated from sandstone containing only 1·80 per cent. lead and yielding only 1·55 per cent. lead, and further that three parts of overlying waste must be removed for each part of sandstone, we find the total amount of sandstone handled during the year to have been 1,443,800 tons, and the total material moved to be 5,775,000 tons, and that for each 24 hours (counting 360 days in the year) the total amount of material moved amounted to 9,600 cubic meters or 16,000 tons. The new establishment at Virginia, when in full operation, will add largely to the production.

I have no doubt, judging from the value of the shares,* that the results of the work are largely profitable in spite of the very low grade of the original ore and the large amount of money invested. The entire operation is a good illustration of the economical advantages attending well directed works applied on a large scale.

ELLSWORTH DAGGETT.

DETERMINATION OF CARBON IN IRON AND STEEL.†

By Andrew S. McCreath, Chemist, 2d Geological Survey of Pennsylvania, Harrisburg, Pa.

The treatment which a steel receives, and the uses to which it may be applied, are frequently determined by the percentage of carbon which it contains ; and especially is this the case in the different steel-works in this country. The part which this element plays in the composition of steel is such an important one that a process for its accurate determination becomes an absolute necessity.

At the meeting of the Institute of Mining Engineers, held at Cleveland in October, 1875, Mr. John B. Pearse read an able and exhaustive paper on "Iron and Carbon Mechanically and Chemically Considered," in which he reviewed the history of the chemical work relating to carbon in iron. It will not, therefore, be necessary to go over this ground again and show that the processes hitherto used for the estimation of carbon are often tedious and generally very unreliable.

The Eggertz colorimetric test is now in general use in the different steel works, and, where properly conducted, seems to answer all the requirements for an intelligent treatment of the steel in the forge and rolling mill. As, however, the accuracy of this test is in the first place dependent on a correct estimation of the carbon in the "standard," it becomes an absolute necessity that we should have a thoroughly reliable method for ascertaining this.

It has been proved that in the ordinary process for the estimation of carbon by dissolving the iron or steel in chloride of copper a loss of carbon takes place, owing to the disengagement of certain carburetted hydrogen gases ($C^n H^a$); but according to the investigations of Prof. Richter, this only occurs when the chloride of copper is not perfectly neutral. He therefore suggested the use of a double salt of chloride of copper with chloride of potassium, or chloride of sodium. He found that these salts were easily obtained crystallized and perfectly neutral, and when the decomposition of the iron took place in these solutions under as perfect seclusion of the air as possible, there was not the slightest trace of the carburetted hydrogen gases given off, even though the reaction was hastened by warmth. Another great advantage obtained by the use of these double salts was that it was not necessary to use hydrochloric acid to remove the precipitated copper. In order to effect this it was only necessary to use a considerable excess of the double salt. Indeed, in the first decomposition, if an excess of the double salt had been used under the application of heat, it frequently happened that no separation of copper took place, and that only cuprous chloride was formed, which remained as a soluble double salt in the solution. The action of this double salt, therefore, seemed to suggest a ready and safe method for the separation of iron and carbon. I made several experiments with the use of the double chloride of copper and potassium, and, while the results were thoroughly reliable, the solvent action of the salt seemed rather slow. I was therefore induced to try the double chloride of copper and ammonium, and this I found to work admirably and answer every purpose. By using a large excess of the salt, the metallic copper, which sometimes separates, is completely dissolved, thereby avoiding acid and consequent liability to a loss of carbon. The solvent action of this salt is such that three to four grammes of iron or steel can be completely dissolved in about fifteen minutes. Another advantage is that the iron can be used in coarse drillings, so that the liability to obtain an unfair specimen by rejecting the larger pieces may always be avoided.

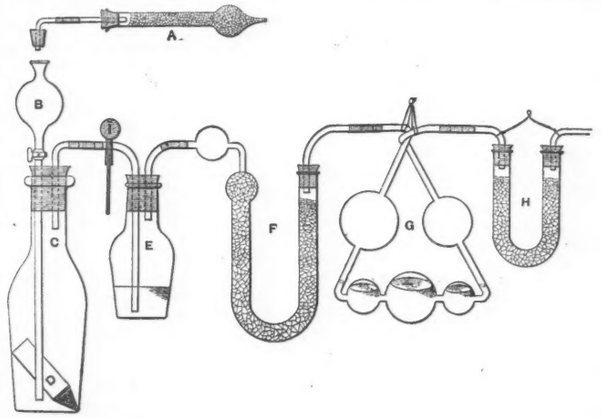
The details of the process are as follows :

Thirty-six grammes of the double chloride of copper and ammonium are dissolved in about 120 cubic centimetres of distilled water ; three grammes of the iron or steel are then accurately weighed off and added to the solution. Decomposition immediately takes place, iron and copper replacing each other. In order to aid solution the mixture is frequently stirred, and after a few minutes a gentle heat may be applied. In about fifteen minutes the iron will be completely decomposed, and the excess of the double salt will have re-dissolved any metallic copper which may have separated out. At this stage of the process the solution is so neutral that upon being heated a thin film of iron oxide forms, but this can be easily removed by a few drops of muriatic acid, and the mixture is now ready for filtration. The carbon is collected in a small test tube about 7·60 centimetres long, and 1·50 centimetres internal diameter, the end of which is drawn out to a point 4 millimetres wide, and stopped first with angular pieces of glass, and then *loosely* with ignited asbestos.

A small quantity of hot water is first run through the filter ; the solution is then added, and the residue washed with hot water until free from chlorides. It sometimes happens that a small quantity of basic chloride of copper separates out in the tube, but this is easily dissolved by a little of the double chloride solution, and the washing is continued till the residue is free from chlorides. To see whether any of the carbon passes into the filtrate, mix the fluid with strong hydrochloric acid (to prevent the separation of any basic chloride of copper), and then dilute. By this means it is easy to recognize any particles of carbon. If the filter has been properly made, the solution filters very rapidly, and all the carbon is retained on the asbestos.

The carbon has now to be converted into carbonic acid, and the weight of the latter ascertained. To accomplish this several methods can be used. The transferring of the carbon residue is always attended with trouble, and there is even danger of losing some of it, so that a method should be used which avoids this objection. A modification of Ullgren's process answers this purpose very nicely. The carbon can be oxidized at once without being dried—an operation which is necessary when it is burned off in oxygen.

The apparatus used for this purpose is shown in the accompanying sketch. A is a tube filled with small pieces of caustic potash, and attachable to funnel tube B by a cork ; B is provided with a glass tap and serves to introduce the



acids. The flask C has a capacity of about 300 centimetres, and the wash bottle E, about 100 cubic centimetres ; the latter is filled about one-third with strong sulphuric acid. The U tube F, which has a height of 11 centimetres and an internal diameter of 1.25 centimetres, is filled with angular pieces of chloride of calcium (*free from lime*) to retain the last traces of moisture. The potash bulbs G and the U tube H are for collecting the carbonic acid. The potash solution used in the bulbs should have a density of about 1.27, and the quantity should be sufficient to nearly fill the three lower bulbs. The left arm of the U tube H is filled with angular pieces of caustic potash, and right arm contains small pieces of chloride of calcium. The bulbs G and the tube H are carefully weighed before being attached to the apparatus. All being ready, the small test tube D, containing the carbon residue, is transferred to the flask C, as shown in sketch. Three grammes of chromic acid are then dissolved in about 10 cubic centimetres of distilled water, and added to the flask C by means of the funnel tube B ; add to the contents of the flask about 50 cubic centimetres of strong sulphuric acid (through funnel tube B), a small quantity at first, then mix the contents of the flask by shaking, and add the rest. Mix the contents thoroughly and heat the flask gently, so that the bubbles of gas do not pass through the wash bottle E faster than three to a second. When the gas has ceased to be evolved, boil the contents of the flask carefully for three or four minutes ; then attach the tube A, remove the lamp, and open the tap of the funnel tube B. Having done this, attach an aspirator to the U tube H, and draw about four litres of air through the apparatus, not faster than three bubbles to a second. When the heat is withdrawn it frequently happens that the condensation of the vapor is so rapid that the liquid in the wash bottle E rushes back into the flask C. In order to control this it is advisable to attach a small compression cock I, and by this means all trouble is avoided. By this method, as described, an estimation of carbon can easily be made in an hour ; and in steels, where the amount of silicium is very small, the carbon may be collected on a counterpoised filter, dried, weighed, and burned off in a platina crucible. This will enable a number of experiments to be carried on at once ; but where the chromic acid method is used, a single estimation requires constant attention. The following are some of the results obtained by the use of this process :

Double chloride of copper and potassium, and oxidation with chromic acid ·510, ·519, ·494, ·504, ·502.

Double chloride of copper and ammonium, and oxidation with chromic acid, ·490, ·502, ·500, ·510.

Double salt, and counterpoise filter, ·500 and ·510.

The double chloride of copper and ammonium works the quickest and gives equally satisfactory results.

I am indebted to Mr. Joseph Hartshorne for the accompanying sketch of the apparatus used.

SAFETY CAGES IN NEVADA MINES.—The bill compelling the use of safety cages in shafts over three hundred feet in depth passed the Nevada Senate on the 26th ult.

[If the Nevada Senate were to pass a "ventilation law," which would oblige the companies to provide a sufficient amount of fresh air through every part of their mines to keep the temperature down to such a point as to allow full work to be done, it would do a service to both the workmen and the companies. The Nevada mines are very badly ventilated—as indeed are most ore mines—and the use of large fans capable of circulating from fifty to one hundred thousand feet of air per minute would certainly greatly reduce the temperature of the mines and enable men to work a full "shift" instead of two or three hours, as is now the case.]—ED. ENG. & MIN. JOUR.

*About a year ago the shares stood 50 per cent. above par.

†A paper read before the American Institute of Mining Engineers at the New York meeting, February, 1877.

MINERAL PRODUCTION OF COLORADO FOR 1876.

STATEMENT OF MINING AND MILLING OPERATIONS.

(*Concluded from page 137.*)

SUMMIT COUNTY

appears to be awaking from her long sleep. The Boston Silver Company successfully operated their smelting works after completing them early in the season. Former processes appear to have been failures. The capacity is about 20 tons daily. The company, although buying ores, obtain their supply mainly from the veins intersected by their 1,200-feet tunnel, which yielded about $200,000 last year. The placer grounds of the Swan and Blue, and of their tributaries, are still profitably worked. Fuller & Company brought larger tracts of country under flume last season, and are operating on a very extensive scale. They obtained $30,000 from Humbug and $12,000 from Mayo gulches, with prospects of a better yield hereafter. Gold Run produced $19,000.

State Assayer J. H. Yonley gives the following as the yield of Summit County for 1876:

	Coin Value.	Currency Value.
Peru and Snake River—Silver and lead bullion, Boston Silver Co. treated 2,500 tons of ore	$200,000	$223,000
Placer mines—Gold dust	150 000	167,250
	$350,000	$390,250

The first silver lode discovered in Colorado is located in Summit County. The mountain-locked situation of this region is the main cause of slow progress, as the lodes are among the best.

LAKE COUNTY

has been laying the groundwork for more extensive operations in the future. The building of the Malta smelting works, and the construction of some extensive placer works, will largely increase the bullion product.

State Assayer Maurice Hayes gives the following as the product of 1876:

	Coin Value.	Currency Value.
Gold—placer	$66,500	$74,147 50
vein	4,900	5,463 50
Silver and lead ore shipped	7,000	7,805 00
Malta smelting works, silver and lead bullion	12,500	13,937 50
	$90,900	$101,353 50

The home market afforded by the Malta works will advance the interests of this section many fold.

FREMONT COUNTY

shows a loss in silver. Aside from the fall in silver, this was due to the stoppage of work on the leading vein of the district from July till December. Since the completion of the Pennsylvania and of the Mallett reduction works, each of 10 tons capacity, mining affairs wear a brighter aspect and display great activity. The saving effected, now that ores are not necessarily shipped hundreds of miles away, is very great.

The yield of 1876, almost entirely silver, was about $280,000. The Boston and Colorado works at Black Hawk smelted $102,000 of this amount, the West Denver reduction works $37,500, and Golden and other works smaller quantities. Some ore was sent East. A small quantity of copper was mined.

The Pocahontas-Humboldt vein produces most of the silver, and is one of the best in Colorado. A yield of half a million is predicted for 1877 from these and other Rosita mines.

THE SAN JUAN COUNTRY

embraces the southwestern portion of Colorado, including Rio Grande, Hinsdale, San Juan, La Plata and Ouray counties. To this may be added the Sangre de Christo mountains, bordering the eastern side of San Louis Park, where a little lode and gulch mining has been done. The entire region has made fair progress, considering its lack of accessibility, and more than doubled the bullion yield of 1875.

The gold district of the Summit mountains produced an even hundred thousand, all of which may be said to have come from the Little Annie vein. The heavy snows of the fall suspended operations till June, except on the Annie and Queen properties and mills.

Some placer gold was obtained in La Plata and Ouray counties. The silver mines of these sections are of great extent, but have no reducing facilities. They are on the Pacific Slope, and form the most inaccessible portion of this region. Between them and San Louis Park are San Juan and Hinsdale counties, rich in silver veins.

San Juan County, located on the crests and at the junction of several mountain ranges from 12,000 to 14,000 feet above the sea level, is said to be the richest locality. Greene's smelter, which is soon to be enlarged, turned out bullion to the value of $100,000 last summer and fall. This is at Silverton. Concentrating works of thirty tons capacity are ready for work: also several reducing works at various points. The Aspen Lode produced $40,000 of the above bullion.

Further east is Hinsdale County. Around Lake City are some splendid silver veins. At this point, eighty-seven miles northwest of Del Norte, are Crooke's ore dressing works and Van Gieson's chlorination and lixiviation mill. The latter is of 7½ tons capacity, was completed in December, and made a run of 25 tons, with a return of $2,800. The Crooke shipped not far from $50,000 worth of dressed ore to three works in New York, and expect to build smelting works at Lake City this spring.

The yield of the San Juan country for 1876 may be stated as follows:

Gold.	
Rio Grande County—Summit Lode mines	$100,000
Elsewhere—lodes and placers	10,000
Silver bullion.	
San Juan County—Greene's	100,000
Hinsdale County—Van Giesen	2,800
Silver ore.	
Hinsdale County—Crooke's	50,000
Ore shipped to Black Hawk and elsewhere	10,000
	$272,800

OTHER SECTIONS

have yielded quantities of gold or silver. The placers of Hahn's Peak, and the Parks in Northern and Western Colorado are among these.

At Golden are two smelting establishments, the Golden Company's and Colorado Company (Collom). The first has drawn its supplies mainly from Clear Creek, Gilpin, Boulder and Fremont counties, and is more successful than formerly. The Colorado works established last summer gets most of its ore from the dressing works of the company at Black Hawk. Both works run steadily.

At Denver the West Denver Dry Ore Reduction Works have been running for months, and are evidently quite successful. About $50,000 worth of bullion was exported up to January, of which $37,500 came from the Pocahontas Mine in Fremont County, and the remainder from the Polar Star Mine, near Georgetown, which is owned by the company. The Swansea works at Denver have done but little, and little is expected of them hereafter. Last year 399·8 tons were treated.

THE COAL MINES

are said to have produced 300,000 tons of coal in 1876. In Denver and other towns coal sells for $4.50 per ton, and for more in the mountains. The railroads all over the State are supplied on contract at the banks at $2 and over per ton. At the latter figure the total value would be $600,000, and at half way between the rates $1,000,000. Coke is now extensively manufactured at Trinidad. The excellent coal deposits in La Plata County in the southwest may cause the extension of the Rio Grande Railway in that direction.

F.

CENTRAL, Col., Feb 15, 1877.

ABSTRACTS OF LECTURES ON MINING.—No. XXXII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(*From the London "Mining Journal."*)

We have considered the method of securing shafts till we get down to a sure foundation. In some cases the masonry is put together at the surface of the ground, and then lowered. In metallic mines, where the shafts are inclined according to the inclination of the vein, this plan cannot be adopted; consequently, where there is much water it has to be kept down by pumping. Even where other portions of the shaft are secured in another manner, as with timber, there will be considerable advantage in securing the upper portion by means of masonry. Where in the old shafts there was only a small area to be protected, our forefathers took a great deal of pains in securing them, and this was by no means thrown away, seeing that otherwise the shafts would have collapsed at the surface. It is too much the case now in metalliferous mines that they are not walled up to the top of the shaft, and consequently this part is forced in, giving rise to expenses and dangers, and leading in some cases to loss of life, and in all causing considerable risk. The means of securing against this would be to line up from a secure foundation the sides of the shaft with stonework. Then, when the mine is abandoned, the top might be covered up with a few large stones, and if it were required again the shaft would probably be found intact, otherwise it would be very likely to have collapsed and have fallen in.

We pass now to another part of the subject—the precautions which have to be taken to prevent the introduction of water into the shaft. In some cases this water may have to be battled with only for a time, in others it entails a grievous constant charge. These methods are known in England under the name of tubbing, or coffering, and the subject is one which had attracted very little attention before the commencement of the present century; since then, however, it has gone through several phases, and in many cases it has accomplished a great success. For example, several cases are known where at first a large array of engines had to be employed to pump out the water, but these have been tubbed so effectually that the mines have been worked quite dry. Tubbing comes into play very seldom in the case of lodes, for the lode being more or less vertical, it is little worth while attempting to protect the shaft, since the water will only make its way down somewhere else along the strike of the lode. Still certain dams may be put in in places, but the process never attains to anything like the importance that it does in stratified rock. If we are sinking a shaft to intersect a lode at a certain point, and are troubled with water at the surface, it may then be worth while to tub out the water, but having once struck the vein the tubbing will be of no use. Suppose that with stratified rocks we have a district of hill and dale, and at some point intermediate between the highest and lowest ground we have to sink a shaft. If this shaft is situated in alluvial material, especially in a valley of a river, where the gravels probably extend to a great distance on each side, then it would be very inconvenient to sink through such ground. Similarly if there were alternating beds of alluvium, gravel, loose sand and clay, it might be a very difficult matter to get through such ground, in consequence of the great quantities of water and the looseness of the ground. If you get below the watery bed you will have the water pouring in, and may perhaps at once need a special engine to raise it. But if you can get down to some water-tight bed, and then put in a water-tight lining, then the water in the watery beds above will circulate round the shaft, but will not enter it, and the water may rise in the beds even to the surface, and thus escape. This would constitute a length of tubbing. In case you have no very considerable depth, yet the strata yield a large quantity of water, there is a considerable advantage gained if you can keep out the water by such means, and thus dispense with pumping arrangements. Having fixed this length the sinking can be continued, and if there be another watery seam a second length of tubbing may be put in, reaching to water-tight beds below. It may give more substantiality to the whole, and at the same time keep out other small quantities of water, if one length of tubbing is run up to the one above, so as to form one continuous length. After this you may come down into the coal measures, and there find another water-bearing bed, it may be sandstone loose in the grain, or greatly fissured and jointed; this you must sink through as best you can till you get down to an impervious bed, such as shale, where another length of tubbing can be introduced. In this manner you get your shaft down to the seam you wish to work, and under suitable conditions of strata, and proper precautions as to tubbing, this may be worked quite dry, although a series of difficulties has been met with in the upper ground. Mr. Potter, one of the viewers of the North of England, has given an admirable description of the sinking of the Merton pits in the Transactions of the Northern Institute of Mining Engineers. Many of the pits in the neighborhood, after passing through the magnesian limestone, came at a depth of 50 to 76 fathoms on a bed of sand, called the Lower Red Sandstone, which is apt to be extremely loose in places, and contains so much water as to be extremely fluid—in fact, a quicksand, and only to be managed with very great difficulty. Yet these difficulties have been overcome, they have withstood the quicksand, and the pits below are now worked dry. Another example of watery strata is to be found in the cretaceous beds of Belgium and North France, where the chalks and marls have been much fissured; but tubbing has been put down to the *tourtia* below, which is an impervious bed, and thus these pits are worked dry. At the Merton pits, mentioned above, the sand was cut at a depth of about 76 fathoms, and the quantity of water cut on reaching these beds was such that several sets of 19-inch pumps were put in, and for a long

time 3,582 gallons of water were raised per minute. This was quite insufficient, and more engines and pumps were erected, giving a total of 450 horse-power engaged in the pumping. Before they succeeded in getting the water down for the purpose of putting in permanent tubbing a total of no less than 1,584 horse-power was at work in divers engines. After this it need not surprise us to find the expense of the plant and sinking of a colliery of this kind amount to from £50,000 to £100,000, and even upwards. And it will also be seen that it would be impossible to work these mines economically without some such plan as tubbing being employed.

As regards the materials employed for tubbing we find brick and stone (generally put in with hydraulic mortar or Roman cement), wood, wrought-iron, and cast-iron. The form is in most instances circular with brick and stone, often rectangular, and in the case of wood, more especially on the Continent, may be polygonal. Before the kind and strength of tubbing for any particular case can be determined it is not enough for the mining engineer to make himsef acquainted with the work generally, but he should examine any cases in the district which will throw light on the subject as to the depth at which the enemy is likely to be met with, and the quantity of water that may be likely to appear, for in some cases you might have the shaft acting as an Artesian well, or the water might reach the tubbing with a very great pressure, and you would therefore require special protection. The deeper you go down with any of these heads of water the stronger is the tubbing required, so that the tubbing will be tapered, as it is called—that is, it will increase in thickness downwards. Tubbing in masonry, although sometimes used in the midland districts, is not often carried out in this country, where the quantity of water is likely to be considerable, but in Westphalia and other districts a good deal of brickwork has been put in rectangular pits, with an arch on each side of the rectangle. A great many of these have failed, sometimes owing to the want of sufficient thickness, sometimes probably to the porosity of the brick, and in other cases from a settlement of the walling, causing cracks to take place. In some parts of Westphalia two, three, and four bricks thick have very commonly been put in where the pressure is considerable. In such cases great care has to be taken about getting a suitable foundation; the bed for the curb has to be very carefully cut, and every space wedged up, to prevent leakage. Little need be said about the tubbing of rectangular shafts with wood: as already mentioned, after the frames are brought together they may be caulked, and this method then serves to keep out a considerable quantity of water, but still it will not stand against any considerable pressure. In some districts it has been sought to strengthen it by putting in additional planks, slid into notches cut into vertical posts, and then stuffing the back with tightly packed moss. In the collieries of the North of England, at the end of the last century, a good many shafts were fitted with "plank tubbing." A broad curb, generally of segments of oak, is placed on a carefully cut bed, and at intervals above it are placed other and generally lighter curbs, supported temporarily by props. An enlargement of the shaft is made for the lower curb, and the space at the back of it is carefully filled up. As soon as a third curb is got into its place planks are spiked on all round the shaft. For the purpose of protecting the vital point—the junction of the lower curb with the bed—a second and lighter curb is often put in these in front, with usually lighter planking, against which the ropes, etc., may rub. Rising in this manner to the upper end of the difficult ground, the whole is secured by putting in another broad wedging curb at the top, projecting into the ground. The most difficult part to secure is the lower wedging curb; thin sheeting deal should be placed in the joints between the segments, and the space at the back also driven full of wedges, to bring the segments together; then the vertical joints should be opened, and wedges (generally of carefully cut pitch pine) driven in. This tubbing has sometimes given way, from the spikes being corroded by the water, or by the action of the smoke and gases from the furnace; or the planks gave way before a great pressure of water, and the mine was inundated. Copper spikes were used with better effect, but it was thought a great improvement when another form of tubbing, with strong blocks of wood, was introduced. This was used in a very few cases in the North of England, but it is largely used in the polygonal shafts of Belgium and France. In these two wedging curbs are often used, the upper one being much the broader; behind this latter a board is placed, and the space behind the board packed full of moss. Then by means of wedges the board is driven back, so as to compress the moss, and after it has been driven back some distance the wedges are taken out, inserted with the broad end downwards, and then other wedges driven in between. By this means the moss is considerably compressed, and a good water-tight joint is secured. Above this a second or third curb will be put in where difficulty is expected. Then above these are built up the solid blocks of wood, the vertical joints coinciding, but not the horizontal, and at the top another wedging curb is put in.

In England the methods of wooden tubbing have been very much replaced by cast-iron tubbing. In the first instance it was attempted to introduce entire rings of iron, but with deep shafts there were two serious objections—that the entire shaft had to be opened to get the ring down, and that when anything was wrong it was very difficult to carry out the repairs, so that very soon the use of segments became general. These segments were put in with flanges abutting against each other; these flanges were placed inside, for the greater convenience of securing the segments by bolts through them. But in consequence of the lowering the fixing and the side pressures to which the tubbing was exposed, it was found that screw bolts could not be trusted to. Hence it was proposed by Mr. Buddle to carry these down in a different way, to put the flanges outside, and trust to the wedging, to friction, and to the pressure from the sides to keep the segments together. The method of putting in this tubbing is very similar to that for putting in the solid blocks of tubbing of the Belgian method. One, two, or three wedging curbs are put in, and the space at the back filled with wedges; the vertical joints are lined with deal, and well wedged up. The tubbing is built up of plates, or segments, 1½ to 1⅝ inches thick; as the strength increases the plates are made shorter, from 1 foot in the strongest part to 3 feet in the upper portions. These segments are strengthened by flanges, and in the centre of each plate is a small hole for the escape of air and water during the building; these holes are plugged up from below when the tubbing is complete. When all is built up the final wedging is carried out by driving in wedges as long as the grain of wood between the joints can be opened with a chisel. When all due precautions are taken we may rely on the water being shut out. Curious accidents have occurred, those due to the pressure of air or gas being most notable. Air left behind with the water, or gas given off from some of the seams, has been so compressed as to make its way through joints impervious to water, and to blow out the wedges even. Care is taken, therefore, in a long length of tubbing to put in a long pipe from behind the tubbing up to the surface, to enable the gas to escape, and in some cases pipes have been similarly put in for relieving the pressure of the water.

CALORIFIC POWER OF FUEL.

TABLE OF THE CALORIFIC POWER OF VARIOUS SUBSTANCES.

One gramme of each of the following substances was burnt.	Product of Combustion.	No. of grams. of wat'r heated 1°C.	Names of Observers.
Diamond	Carbonic acid	7,770	Favre and Silbermann.
Graphite, native	" "	7,811·5	" "
" another specimen	" "	7,781·7	" "
" artificial, from blast-fur.	" "	7,787·5	" "
" " another spec.	" "	7,737·1	" "
Carbon of coal-gas retorts	" "	8,047·3	" "
Charcoal from wood	" "	7,237	Lavoisier.
" " "	" "	7,167	Dulong.
" " "	" "	7,912	Desprets.
" " "	" "	7,714	Grassi.
" " "	" "	8,080	Favre and Silbermann.
" " "	" "	7,900	Andrews.
" from sugar	" "	8,039·8	Favre and Silbermann.
" from wood	Carbonic oxide	2,473	" "
" " "	" "	2,227	Andrews.
* " " "	Carb. acid and nitrogen	11,158·2	Favre and Silbermann.
Carbonic oxide	Carbonic acid	2,402·7	" "
Hydrogen gas	Water	34,462	" "
" "	"	33,808	Andrews.
" "	"	34·743	Dulong.
" "	"	34,666	Grassi.
† " "	Hydrochloric acid	23,783·3	Favre and Silbermann.
Marsh-gas	Carbonic acid and water	13,063	" "
"	" " "	13,108	Andrews.
Olefiant-gas	" " "	11,857·8	Favre and Silbermann.
"	" " "	11,942	Andrews.
Alcochol, anhydrous	" " "	7,183·6	Favre and Silbermann.
" "	" " "	6,859	Andrews.
Sulphur, native, in fine crystals, very pure	Sulphurous acid	2,220·9	Favre and Silbermann.
Sulphur, native, opaque	" "	2,249	" "
" melted 7 yrs. previously.	" "	2,216·8	" "
Sulphur melted an hour after crystallization	" "	2,258·6	" "
Sulphur in the soft state half an hour after melting	" "	2,253·2	" "
Sulphur in the state of flowers	" "	2,307	Andrews.
Bisulphide of carbon	Car. & sulphurous acids	3,400·5	Favre and Silbermann.
Silicon, amorphous	Silica	7·830	Troost and Hautefeuille.
Silicon, after fusion and crystallization	"	7,540	" "
Boron, amorphous	Boracic acid	14,420	" "
Phosphorus	Phosphoric acid	5,747	Andrews.
Zinc	Oxide of zinc	1,301	"
Zinc		1,357·6	"
Magnesium		6·130·5	Ditte.
Iron	Magnetic oxide (?)	1,134	"

* Supporter of combustion, protoxide of nitrogen.
† Supporter of combustion, chlorine, and in all other cases oxygen.

TABLE SHOWING THE ACTION OF VARIOUS REAGENTS UPON LIGNITE, BITUMINOUS COAL AND ANTHRACITE.*

Coal.	Reagents. Nitric Acid.	Sulphuric Acid.	Hypochlorate of Soda.	Potash.
Lignite, or Post-carboniferous.	Wholly decomposed; solution light-yellow; residue white.	Wholly decomposed; solution, pale orange-red; residue, white.	Much acted on; solution deep-red and thick; residue dark colored.	Much acted on; solution very deep red and thick; residue dark colored.
Carboniferous Age. Bituminous Coal.	Much acted on; solution, light gre'nish yellow; residue dark-brown.	Much acted on; solution of the color of a light port wine; residue dark color'd.	Less acted on; solution brownish-yellow; residue nearly black.	Also less acted on; solution light yellowish-green; residue nearly black.
Anthracite.	Apparently unacted on; the acid remained colorless and the coal black.	Little acted on; solution, light-red; residue dark colored.	Little acted on; solution light-yellow; residue nearly black.	Very little acted on; solution tinged with yellow; residue nearly black.

* Compiled from results of experiments by John Percy, M.D., F.R.S., F.G.S. Heat was not employed, nor were the reagents used in a concentrated state, but the action was allowed to go on during several years.

NOTES.

THE WEST SIDE CHICAGO PUMPING WORKS coal bill for the month of February was $2,280.26, representing 413 tons of coal.

THE RUGGLES MICA MINE.—This mine is situated in Grafton N. H. The January shipments amounted to about 3,600 pounds of mica, which brought on an average $2 per pound.

BURNING COAL.—The Anzin Company burns up lean and poor coal by help of a blast beneath the fire-bars. The blowing appartus is a ventilator put in motion by a small horizontal engine. The blast is brought under the bars, at a pressure of ¾ inch of water, by a swan's-neck cast pipe, so that it is parallel to the bars, and the ash-box is hermetically shut by cast-iron doors. The saving is put at 35 per cent. of the value of good fuel.—*Iron.*

THE RICH ORE OF THE KEARSARGE MINE.—Since the recent rich strike in this mine, which belongs to Messrs. Lilly, Leisenring & Co., the company have shipped ore as follows:

February	1,	299 pounds, Class A	$1,311 11
"	6,	13,838 pounds, Class C	5,101 30
"	9,	1,048 pounds, Class A	3 991 95
"	9,	4,212 pounds, Class B	3,548 61
"	26,	15,500 pounds, Class C	3,431 78

This shows a product of $17,385, or about $1,000 to the ton.—*Salt Lake Tribune.*

ARTIFICIAL IVORY.—Natural ivory has been investigated as to its composition, and the proportions of the materials found *in natura* have been adopted for the manufacture of artificial ivory. Two parts of indiarubber are dissolved in 36 of chloroform, and the solution saturated with pure ammoniacal gas. The chloroform is then distilled at 180° Fah. The residue is mixed with phosphate of lime, or pulverized carbonate of zinc, pressed in moulds and dried. When phosphate of lime is used, the artificial product resembles natural ivory very closely. The matters for which no substitute is provided are of small importance. In Paris M. Dupré makes artificial ivory with papier mâché and gelatine. Billiard balls made of this substance cost only a third the price of ivory, while they possess all its hardness and elasticity. Used for other purposes, this pasty compound takes the name of Paris marble, and is worked up for mouldings, capitals of columns and architectural ornamentation generally.—*Iron.*

THE "SELDEN" DIRECT ACTION COMPOUND STEAM PUMP.

(WITH SUPPLEMENT.)

Direct-acting steam pumps, of which the "Selden" is one of the best known and most popular types, have acquired such general favor that they are coming into universal use in our mines. In these pumps the steam and water cylinders are set in a direct line and connected rigidly by a center-piece, the piston rod passing directly from the steam piston to the water piston or plunger, both being rigidly fastened to the same rod.

In the simple steam pump the steam enters at the commencement of the stroke, and the valves remain full open for the whole stroke. The steam valve is moved by steam, and the admission and release of steam take place instantly at each end of the stroke.

This arrangement, while it greatly simplifies the machinery, is necessarily very wasteful of steam. Some economy has been gained in engines where the steam cylinder is larger than the water cylinder by condensing the exhaust steam in the suction pipe, but even this was far from giving the economical results to be attained by making use of the expansion of steam in the cylinder, which has been secured in compound pumps. This question of economy or "high duty" has attracted much greater notice in waterworks than in mines, but the importance of the item "pumping" in many of our metal mines is also calling for attention, and we hear of compound engines being ordered for several Western mines.

Mr. A. Carr has met this demand very satisfactorily, by compounding the Selden pump in the following manner:

Two steam cylinders are used and are placed in line so that the piston rod

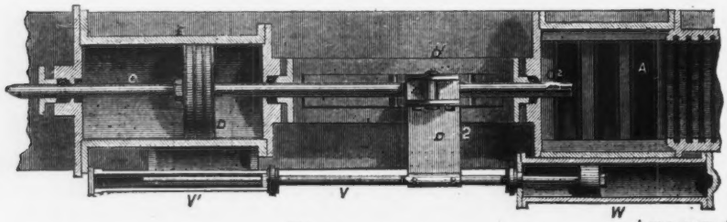


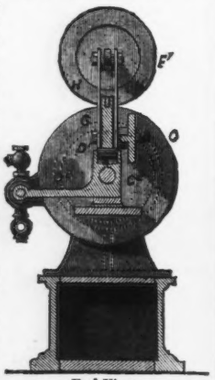
Fig. 3.

passes through both, the pump still remaining a "direct action" pump with one piston rod. The auxiliary piston driving the main steam valve of the smaller or high pressure cylinder is directly connected to the steam valve of the larger or low pressure cylinder so that the valves of both cylinders move simultaneously, the exhaust steam passing from the high pressure cylinder directly to the steam chest of the low pressure, and thence to the cylinder. The pipes (one on each side) leading from the exhaust of the high pressure cylinder to the low pressure steam chest, are, with the steam chest itself, made very large, and have two or three times the cubic capacity of the high pressure cylinder; this forms an expansion chamber and tends to equalize the pressure in the low-pressure cylinder; that is, the initial pressure is lower, and the terminal higher than it would be without this expansion chamber. As this equalization is not complete, the high-pressure cylinder has two passages at each end, one at the end, the other passing in at a distance from the end, nearly equal to the thickness of the steam piston; the latter only takes live steam, while both are opened for exhausting.

With this arrangement, the high pressure piston must move far enough to uncover the steam port before it receives any positive pressure. The reversing of the pump is therefore entirely due to the low-pressure cylinder, and is performed at a time when there is an excess of pressure to do it. Just as this excess is expended on reversing the pump and taking up the load, the steam port in the high-pressure cylinder is uncovered and the pump moves easily and steadily to the end of the stroke, without any apparent diminution of velocity, the same being repeated from the other end of the cylinder for the next stroke. The great and sudden shock in reversing, which has heretofore constituted the principal objection to direct-acting pumps, is here completely corrected.

The valve is the usual plain slide valve. The water end of the pump is arranged so that the bed forms the suction chamber, being cast hollow under the water cylinders.

The form of the valves gives them very long admission and emission edges, so that they give the area of the suction pipe with a very short lift; thus causing them to seat very quickly and allowing very little slip. The condenser is set on one side of the water end of the pump, and is a simple jet condenser, the steam entering the center of the stream of water as it enters the condenser. The water for the condenser is taken from the bed of the large pump and returned to the same place.



End View.

The boiler feed pump consists of the end of the circulating pump rod carried out so as to form a single acting pump, while at the same time it serves as a guide for the circulating pump.

The suction of the feed pump is connected to the outside end of the circulating pump cylinder, so that while the latter is discharging, the former is taking suction. The water going to the feed pump is that which has passed through the condenser, so that the rise in temperature is taken advantage of for feeding the boiler. A stop-cock regulates the supply to the feed pump, so that the boilers can be fed regularly. A valve is placed in the low-pressure steam chest by which the pump can at once be changed from compounding to working with both cylinders, receiving live steam from the boiler, and condensing or not, as desired; this valve may be so set that a little live steam from the boiler will enter and supplement that being exhausted from the high-pressure cylinder; this is found very convenient in starting the pump. By these means the power of the pump can be enormously increased in emergencies requiring it to do a higher duty for a short time. It will be seen that this pump is very simple and direct in its construction, considering that it is a complete compound condensing engine, with pump, on a single bed-plate requiring only the connection of steam and water pipes.

In the accompanying illustration (Figs. 1 and 2 are on the supplement sheet), Fig. 1 is a vertical longitudinal section of the engine and pump. Fig. 2 is a cross-section at the line x x, and Fig. 3 is a partial sectional plan.

The pump-cylinder a, piston b, inlet a', outlet b', and valves, are of any desired character, and those shown illustrate the connection of a pump with the other parts. The small steam-cylinder c is provided with a piston d, and the piston rod c^1 extends to the cross-head d', and is in line with the rod c^2 of the pump. The steam-ports, small auxiliary valve e, main valve f, and valve-operating piston e' in the cylinder f' are substantially the same as those shown in Patent No. 143,807, granted October 21, 1873, to Adam Carr.

When the engine is cold it sometimes happens that the steam pressure admitted by the secondary valve does not act with sufficient rapidity in the cylinder c to move the piston d and main valve; hence the engine-piston may thump against the cylinder heads. To obviate this, and to prevent the possibility of accident from any temporary derangement of the parts, the guard-rocker h is used; this is preferably made in two parts, so as to be at each side of the rocker g, and swing upon the same gudgeon, and from the upper end of this guard-rocker there is a loop-link, notched in the middle to sit upon the rod h', that is connected with the valve-operating piston e', so that if that piston does not move fast enough by the action of the steam its movement at the proper time may be insured by the cross-head acting upon the rocker before the stroke is completed. The piston rod h' has upon it lock-nuts 6 for the loop-link to operate upon, and these should be sufficiently far apart to allow the valve-moving piston to act by the steam alone under ordinary circumstances, so that the guard-rocker only comes in action when the steam does not properly move the main valve and its piston.

The larger or secondary cylinder m of the compound engine is provided with a piston, n, the rod of which passes to the piston d of the high-pressure cylinder, so that the two pistons move together, one in aid of the other, and both exerting their power upon the piston-rods.

In order to arrange this engine so that the secondary engine may be partially or entirely supplied by live steam from the boiler, as occasion may require, the exhaust steam is led through the ports 9 and 10 in the divided steam-chest r', and through the D slide-valve s that is placed over these ports, and said valve s is operated by a handle, 12, or other means, and the face 14 of this valve s is wide enough to cover the secondary exhaust port 15 when the face 16 of the valve s is over the port 10, and this face is narrow, so that the exhaust steam can pass through the port 10 at one side of such face 16, and the live steam will pass by the pipe t' in at the other side.

The relative widths of these openings can be varied by moving the valve s, and by shifting the valve to the position shown by dotted lines in Fig. 1, the exhaust from the primary engine will pass from 9 through the port 15 and pipe to the exhaust r, and the steam from the boiler will go to the secondary cylinder by the port 10, so that the secondary cylinder may be operated by the boiler-steam or by the exhaust steam from the primary cylinder, as occasion may require. The cross-head d^1 is extended out as an arm, d^2 (Figs. 2 & 3), and connected with the piston-rod v of the air and water pump w of the condenser, which rod also extends into the pump v', which pump serves to supply the boiler with water.

By this arrangement the feed-water pump and the condenser-pump serve as guides to the piston-rod that is common to both, and this piston-rod serves as a guide to insure the parallel movement of the cross-head that unites the respective piston-rods and actuates the valve-rocker.

MINING NOTES.

THE COMSTOCK MINES.

The *Gold Hill News* of the 8th inst. has the following: The California Mine continues its daily output of 550 tons of ore of a uniformly rich character. The Consolidated Virginia continues its daily yield of 285 tons of ore. A large amount of repair and miscellaneous work is being done in this mine. A large amount of low grade ore has been struck in the 1,600-feet level of the Julia. The ore breasts on the 1,465-feet level of the Ophir are improving. The daily yield of this mine is 25 tons. The new shaft of the Yellow Jacket is down nearly 600 feet. The Justice yields 365 tons of ore per day, keeping the mills steadily running. The ore vein on the 1,000-feet level is proving richer in gold than on the levels above. This company sent forward $111,942 in bullion from the 8th to the 28th of February. Over 600 men are employed by the company, the pay roll amounting to over $60,000 per month. The Sutro Tunnel is now in over 16,000 feet, the rate of progress being about 100 feet per week. A warm body of water was recently struck, which would seem to indicate the header to be in the vicinity of some of the eastern fissures of the Comstock. The total flow of water now is about 113 miner's inches.

NOTES.

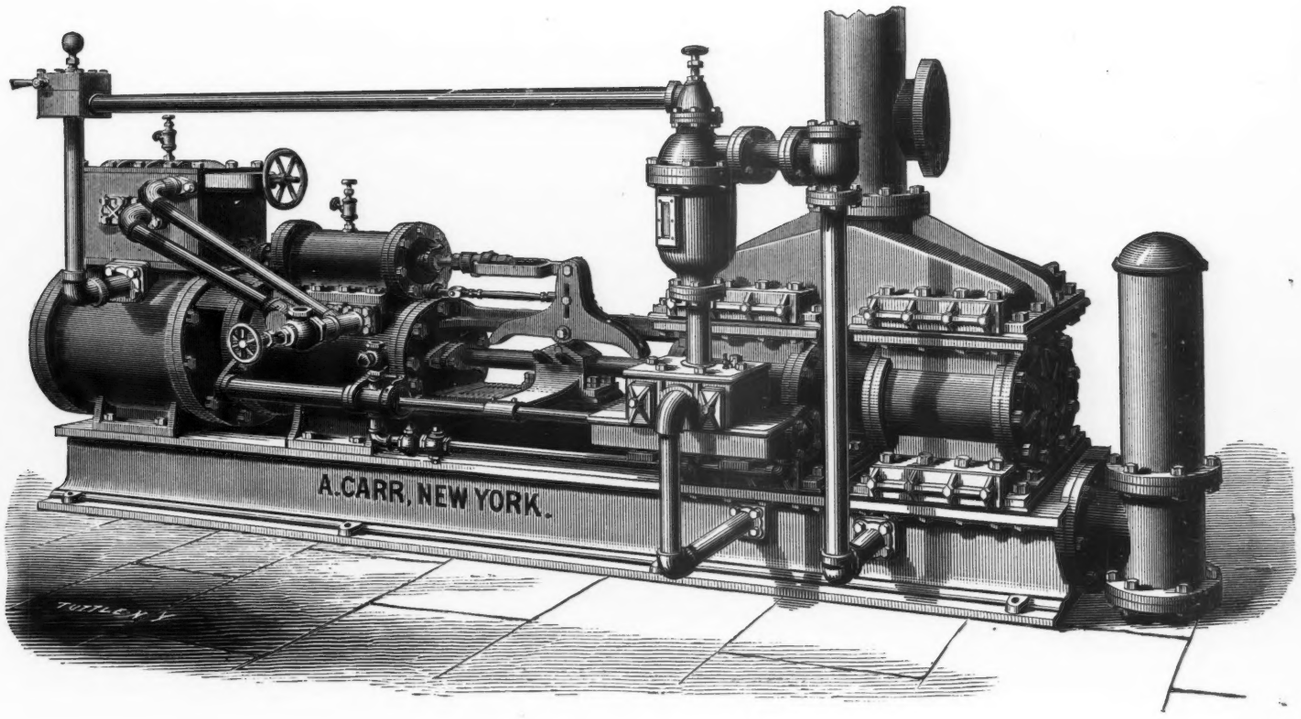
LASTING QUALITIES OF MINE TIMBERS.—Where the supports of the galleries in the salt mines of Poland have been made from wood, it has been known that such timbers outlasted columns of stone or brick.

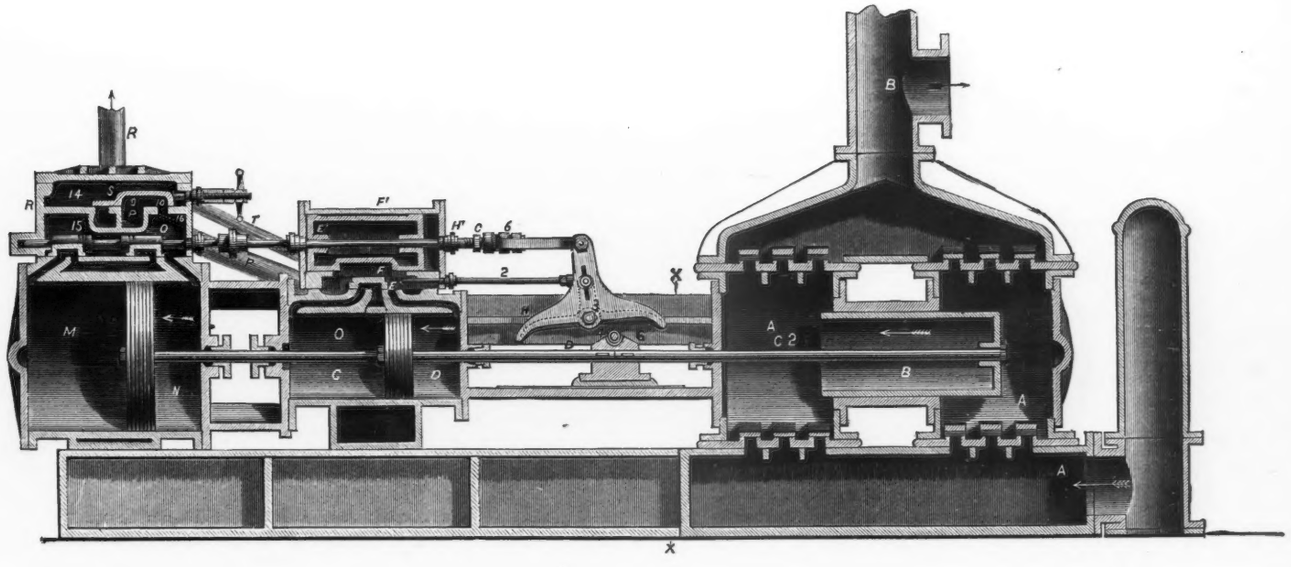
DISCOVERY OF APATITE IN CANADA.—Mr. Miller has struck a wonderful bp rich mine of apatite, native phosphate of lime, in the rear of Templeton, near Ottawa. He has been taking it out at the rate of three tons per day of picked blue phosphate.

THE METRIC SYSTEM IN NEW JERSEY.—The *Iron Era* of Dover, N. J., after referring to the advocacy of the adoption of the metric system by this Journal, adds: Mr. Cooper of this county introduced a resolution in the Assembly on Tuesday favoring the adoption of this system in this State.

QUINCY & RUSHVILLE (NARROW GAUGE) RAILROAD.—Parties interested in the coal fields of Brown and Schuyler counties, Illinois, have decided to build a narrow-gauge local road from Quincy northeast to Rushville, about fifty miles. The working survey is being made. A proposition has been received by the company from a responsible party offering to do the grading on the entire line and put in all culverts less than ten feet for $1,000 per mile.

A REMARKABLE SUBMARINE VOLCANO.—The *Honolulu Gazette* of Feb. 28 contains an account of a remarkable submarine volcanic outbreak in Kealakeakana Bay, near the entrance of the harbor. The natives report that the eruption occurred at 3 o'clock on the morning of the 24th, appearing like innumerable red, blue and green lights. In the afternoon several boats visited the eruption, cruising over the most active part, where the water was in a state of peculiar activity, boiling and appearing as if passing over rapids, or very much like the water at Hell Gate, New York. Blocks of lava two feet square came up from below, frequently striking and jarring the boats. As the lava was quite soft no harm was done. Nearly all of the pieces on reaching the surface were red hot, emitting steam and gas strongly sulphurous. A rumbling noise was heard, like that of rocks in a freshet, caused, no doubt, by the eruption of lava from the submarine crater, which is supposed to be a crack or line of rupture, extending at least a mile from shore. Another rupture, doubtless a continuation of the submarine fissure, was traced inland from shore nearly three miles, varying in width





THE "SELDEN" DIRECT ACTION COMPOUND STEAM PUMP,

MANUFACTURED BY A. CARR, 43 CORTLANDT STREET, NEW YORK.

from a few inches to three feet. In some places water was seen pouring into the abyss below. A severe shock or earthquake was felt by residents of Kaowalsa and Kell during the night of the eruption, which must have preceded the outbreak. It was quite severe, but no damage is reported.

PENNSYLVANIA RAILROAD COMPANY. (Annual Report for 1876.)— We extract the following from the thirtieth annual report of this company, as submitted to the stockholders at their meeting in Philadelphia on the 13th inst.:

The total earnings and expenses of the main line from Pittsburg to Philadelphia, including branch and leased lines, and from Philadelphia to New York, including the Delaware and Raritan Canal, the Belvidere Delaware Railroad and the Flemington branch, and of the Philadelphia and Erie Railroad, were as follows:

Gross Earnings.—General freights, $21.132,560.23; first-class passengers, $13,152,-867.44; emigrant passengers, $184,671.56; express matter, $598.719.10; mails, $377,747.68; miscellaneous, $561,943.20; canal earnings (Delaware and Raritan Canal), $882,551.78. Total earnings, $36,891,060.99.

Working Expenses.—Conducting transportation, $8,134,868.55; motive power, $6,283,018.90; maintenance of cars, $1,997,347.83; maintenance of road, $4,713,385.40; general expense, $420,302.64; canal expense (Delaware and Raritan Canal), $523,-306 02. Total expenses. $22,081,229.34.

Net earnings for 1876, $14,809,831; deduct interest or rental charged on equipment used by Philadelphia and Erie Railroad, $243,986.03; on Belvidere Delaware Railroad, $25.528.85; on branch roads, $74,387.10. Total, $343,901.98, which leaves $14,465,-929.67.

Deduct rentals paid on Philadelphia & Erie Railroad, $920,547.22; on Belvidere Delaware Railroad, $210,366.48; on branch roads, $500,630.19. Total, $1,631,543.89.

Leaving as net earnings from the operations of all lines, $12,834 385.78; net earning for 1875, $11,423,196.22; increased net earnings as compared with 1875, $1,411,-189.56.

The operations of the coal companies in which the Pennsylvania Railroad Company is interested were as follows:

The Susquehanna Coal Company produced in 1876, 568,370 12-20 tons.

Its gross receipts were	$2,126,883 48
Expenses, including interest on bonds and mortgages, royalty, depreciation of live stock, and other property at mines	2,112,823 42
Net surplus over all expenses, interest and depreciation	$14,060 06

The charge for royalty on coal mined, referred to in the last report, has been reduced from 25c. to 10c. per ton, that amount being considered sufficient to cover the purposes of sinking fund for bonds, and depreciation of property. All taxes, insurance, and interest on indebtedness are included in expenses as above stated.

The Summit Branch Railroad Company produced 241,706, 2-20 tons of coal.

Gross earnings	$1,157,854 70
Expenses, including interest on bonded debt and charge on coal mined to cover depreciation of lands	1,070,114 24
Net profit on business for year	$87,740 46

The Lykens Valley Coal Company produced 155,165 7-20 tons of coal.

Gross earnings	$567,794 10
Expenses, including interest on old bonds, etc.	707,632 49
Loss for year	$139,838 39

—being a decrease in loss of $153,459.32 as compared with last year.

The Mineral Railroad and Mining Company produced 320,700 8-20 tons of coal.

Gross earnings	$883,299 04
Expenses	792,804 18
Net earnings	$90.494 86
Decrease as compared with 1875	71.540 22

The aggregate results from the several anthracite coal companies were as follows:

	Tons.
Total production 1876	1,285,942
Total production 1875	1,390,001
Decrease	104,059

In the month of December an arrangement was made with the Philadelphia & Reading Railroad Company for moving a portion of its anthracite coal traffic over your lines between Port Richmond and South Amboy, the Reading Company furnishing the engines, cars and train service, and your company receiving a trackage which is satisfactory. This arrangement, it is believed, will be of great importance to the Philadelphia & Reading Railroad, and be an increasing source of revenue to your company.

Delaware & Raritan Canal Company.—The actual cost of operating this canal was 59 4-10 per cent. of its receipts; in 1875 it was 50·67 per cent. The number of tons of freight moved (including 119,375 tons of fuel and other materials for the company's use) was 2,636,845, embracing 892,284 tons of coal. It was last year 2,523,486 tons, showing an increase of 107,359 tons, or 4·25 per cent. Before the close of the year it was deemed advisable to keep the rail mills on the lines employed during the winter months, when they might otherwise be idle. To do this the company entered into an arrangement with the Cambria Iron Company and the Pennsylvania Steel Company for the supply of steel rails that would be needed during 1877, these companies to make the rails at any time during the winter, and the Pennsylvania Railroad Company to give them its vouchers for the amount inspected and delivered, payable at the times the rails would be required for use in 1877, say April, May, June and July. The amount of vouchers issued up to December 31, 1876, was $338,131.71. These companies have thus been enabled to keep all their works and forces employed, and the arrangement has been advantageous to all parties. The vouchers as they mature will be paid out of current earnings and charged to expenses. About 17,000 tons of new steel rails were laid on the different lines of the company during the year; also forty-nine first-class locomotives and 733 new box, stock and 1,000 eight-wheel coal cars of 15 tons capacity each were built to replace worn out or inefficient rolling stock.

The par value of bonds belonging to the company amount to	$45 286,468 17
" " stocks	51,808,836 00
Total	$97,005,244 17
Cost as per general account	70,524,800 27
The profit on these investments amounts to	26,480,044.90

Pennsylvania Canal Company.—

Gross receipts for the year	$409,773 46
Expenses	241,081 41
Net earnings 1876	$168,692 05

Being a decrease in net earnings from operating the canal of $35,339.92, as compared with 1875.

OUR GROWING FOREIGN MARKET FOR IRON.—There is great hope for iron manufacturers and locomotive builders in what is going on in the southern hemisphere, particularly in Australia and Brazil. The need of railways in Australia has been seriously felt, and in South Australia alone the government proposes to spend $10,000,000 in constructing them. Nearly 100 lines of railroad are now building or under survey in Brazil and in this country, as well as in Australia; American rails and rolling stock are in high favor. Orders for locomotives for Australia have recently been received in Paterson, N. J., while Russia, also, has ordered a number of cast-iron car wheels for trial on the road from Moscow to Odessa.

A QUEER PHASE OF GOLD AND SILVER WORK.—On the recent closing up of the Smith & Rogers silver-plating concern in New Haven, on its removal to Meriden, the floor of the plating-room was taken up, burned, and the ashes analyzed, with the result of procuring pure silver to the amount of $981. This result is not so strange as appears at first sight. The precious metals are capable of extreme volatilization under heat, becoming mere vapors, which may be condensed, resulting in the production of the metal in a pure form. But, even without heat, the particles of gold and silver are made so exceedingly fine, in the processes of the manufacture of gold and silver goods, whether solid or plated, that no devices for saving the material abraded or thrown off in the various manipulations are entirely effectual. Even in the Government assay offices the soot deposited in the chimneys from the melting of the crude metal is valuable; and in most manufactories of articles of gold and silver the proprietors do not allow the workmen to retain their work clothes when worn out, but pay for them a price generally sufficient to procure new garments—an old tattered vest belonging to a bench workman sometimes being valued by his employers, even when worn to rags, at $20.—*Hartford (Conn.) Times.*

PAPER MONEY WORTH MORE THAN GOLD IN FRANCE.—The banks of this city, and indeed those of all parts of the country, will do well to note the movements of the Bank of France, in fortifying themselves against the day of evil, whether it be near or remote. There is nothing more hazardous in banking than that of owing largely on circulating notes of small denominations. As circulation increases, a prudent banker will, as far as possible, confine it to bills of the larger denominations. The Bank of France, by the return for the week ending February 22, had in its vaults the enormous sum of 2,230 million francs, against a note circulation of 2,615 million francs, or more than 85 per cent. The bank has just begun the practice of charging a percentage for issuing its notes on deposits of bullion and foreign coin, for the purpose of reducing its circulation by making it expensive for holders of gold to obtain paper for it. The fact that the bank now pays out gold freely to all creditors has been noted. It may not be so well known that it has withdrawn from circulation all its notes of 20f., 25f. and 50f. coming in for payment, and there are now very few notes circulating of a lower denomination than 100f. or $20. It is a much larger and more difficult task to redeem the 100 franc notes, but the bank throws obstacles in the way of re-issuing them, asking creditors to take gold coin instead, and only giving them out when the applicant is persistent.

The bank has announced that it will hereafter make advances upon bar silver at 1 per cent. per annum, with a margin of 10 per cent. of French Rentes deposited with the bank. This is a return to the custom prevailing before the panic in silver. The effect will be to steady the market, and may be regarded as indicating faith in the future value of silver.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending March 10.

Tons of 2,240 lb.	1877. Week.	1877. Year.*	1876. Week.	1876. Year.*
Wyoming Region.				
D. and H. Canal Co.	38,417	357,84	8,330	252,379
D. L. and W. RR. Co.	34,495	352,760	8,427	205,592
Penn. Coal Co	17,495	148,501	—	179,259
L. V. RR. Co.	15,929	170,861	4,047	120,282
P. and N. Y. RR Co	1,265	8,410	—	3,952
C. RR. of N. J.	44,918	211,469	791	115,674
	152,519	1,249,841	21,595	877,138
Lehigh Region.				
L. V. RR. Co	42,689	417,503	13,058	233,502
C. RR. of N. J.	44,978	188,921	3,198	142,153
D. H. and W. B. RR.	346	4,363	913	5,305
	88,013	610,792	17,169	380,960
Schuylkill Region.				
P. and R. R. RR. Co.	67,408	666,589	16,062	287,948
Shamokin & Lykens Val.	10,326	68,896	6,613	34,638
	77,734	735,485	22,675	322,586
Sullivan Region.				
Sul. and Erie RR. Co.	124	2,178	1,414	10,879
Total	318,390	2,593,296	62,833	1,591,563
Increase	255,537	1,006 733	—	—
Decrease	—	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 55,849 tons, as compared with the corresponding period in 1876.

Receipts of Coal at Boston, for the week ending March 9, and years from Jan. 1.

Tons of 2,240 lb.	1877. Week.	1877. Year.	1876. Week.	1876. Year.
From				
Alexandria and Georgetown	820	1,292	700	4 162
Philadelphia	9,598	45,663	8,662	30,438
Baltimore	2,224	13,674	600	14,494
Other places	1,695	33,207	4,148	30,800
Great Britain	—	707	—	1,806
Nova Scotia	—	—	—	199
Total	14,337	94,549	14,110	81,899

Belvidere Delaware RR. report, for week ending March 10.	Week.	Year 1877.	Year 1876.
Coal for shipment at Coal Port (Trenton)	—	—	1,918
" " " South Amboy	15,763	95,931	84,213
Coal for distribution	2,622	31,344	19,696
Coal for Company's use	1,420	14,519	10,374

Perth Amboy business:

	Tons.
Received for the week	18,328
Shipped for the week	17,912
On hand March 10	153,933

The Production of Coke for the week ending Feb. 28.

Tons of 2000 lb.	Week.	Year.
West Penn. RR.	2,069	15,343
Southwest Penn. RR.	10,763	104,281
Penn. & Westmoreland Region, Penn. RR.	1,429	14,346
Pittsburgh, Penn. RR.	2,087	28,869
Total	16,318	162,839

The Production of Bituminous Coal for the week ending March 10 was as follows:

Tons of 2,000 lb., except where otherwise designated.	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb	1,621	108,317
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	7,888	74,403
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,625	25,278
*East Broad Top	832	6,956
Clearfield Region, Pa.		
*Snow Shoe	847	9,455
*Tyrone and Clearfield	26,501	206,287
Allegheny Region, Pa.		
*Pennsylvania RR	3,373	31,030
Pittsburgh Region, Pa.		
*West Penn. RR	3,206	33,110
*Southwest Penn. RR	844	10,817
*Penn. & Westmoreland gas coal, Pa. RR.	16,865	151,858
*Pennsylvania RR.	6,505	63,379

*For the week ending Feb. 21.

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, March 16, 1877.

Anthracite.

On Tuesday the Pennsylvania Coal Company announced that it would sell on the 20th inst. 225,000 tons of its coal, deliverable from Newburg during April and May. The first announcements through the daily press

were not explicit, and it was the impression that this quantity was to be delivered during one month, and as a consequence considerable demoralization ensued until the facts became known. In the present overstocked condition of the market this quantity is entirely too great for the demand, and low prices are generally anticipated. The Delaware, Lackawanna & Western Railroad Company announces that it will sell on the 28th inst. 100,000 tons of coal. Since the announcement of these sales there has been but very little business done, and there is not likely to be an improvement until after the Scranton sale.

Upon the announcement of the Pennsylvania Coal Company's sale it was supposed that it was simply a bluff movement, or that this large quantity of coal was offered with the view of bringing the present unsatisfactory state of affairs to a crisis. In an interview with Mr. Hoyt, the Vice-President of the Company, we were informed that it was to partially meet a demand made upon the company by its customers to make season prices—a policy forced upon it by the Philadelphia & Reading Railroad Company, which has been offering to deliver coal throughout the season at very low prices. Although the Pennsylvania Company refuses to name season prices, yet it departs from its usual custom and asks its customers to name their own prices for two months.

Prices are very much demoralized and lower than a week ago. We hear of stove coal having been freely sold at $3.20 f.o b. at shipping ports, while other sizes have born their usual difference.

The production for the first 10 weeks of the year was at the rate of less than 14,000,000 tons, yet we find that it had increased over the production of the corresponding period of 1876, 1,006,733 tons. The production last week was 318,390 tons or at the rate of less than 17,000,000 tons per year, although entirely too great for the present wants of the market. The production for the week ending March 3 was 255,269 tons, and the increase last week over the corresponding week of 1876 was 255,537 tons.

Yesterday wages were reduced in the Wyoming region about 15 per cent. There are indications that some trouble will occur; some of the miners having stopped work already, while the others are restless. There is, however, no organization among them, and in their present distressed condition it is not likely that any strong or extended opposition will be made. With the present reduction wages will not be near so low as they were before the war, and by steady work the miners will do better than they have for several months past.

Bituminous.

A sale of 5,000 tons of Clearfield coal on foreign account is reported. A very good business is being done in this coal, although supplies were partially curtailed for over a week by a strike among the drivers at some of the mines. Work, however, was fully resumed yesterday. The strike in the Cumberland region continues, the miners refusing to submit to the proposed reduction. In the face of the reduction of 15 per cent. made in the wages of anthracite miners, and the competition that will come from this and Clearfield coal, the Cumberland miners should promptly resume work at the very moderate concession asked, and be contented in not having a greater, and as it would seem from the outlook, necessary reduction. Some of the companies might set a good example in their efforts to economize and in making demands for lower wages and lower rates of transportation if they were to trim down the high salaries of Presidents and other officers. These could certainly stand a reduction, and in some cases 50 per cent. would not be too much.

It looks as though the Baltimore & Ohio Railroad Company had been making private rates of freight for the season for some of its favorites, giving them an opportunity to enter the market and secure business previous to some of the companies knowing what prices they will be able to quote. If it should prove true it must react upon the company, for such a short-sighted policy can never bring any permanent profit or advantages.

Gas Coals.—Freight rates have not been fixed, and as a consequence the prices for gas coals have not; although by some it is thought that they are likely to be at a very early day. The condition of the market is such that it requires the most careful consideration of the railroad managers who will say in reality what prices shall be. The gas companies have large supplies, and with the low prices of English and Nova Scotia coals feel themselves independent of the domestic mines. If the railroad companies fix upon high prices there will be but very little business done. We notice that shipments are to begin at Block House, N. S., a steamer having been chartered to bring to this city 1,200 tons at $1.75 currency, the price to be paid for the coal being $1.75 gold, f.o.b. at Cow Bay. Should this low rate of freight prevail we may look for larger supplies from the provinces than for several years past. The Cannelton Company announces $10 as the price for its cannel coal.

New York and Philadelphia.

Wholesale Prices of Anthracite Coal f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	2 95	2 95	2 95	3 00	3 60	3 35
Wilkesbarre at Port Johnston	3 00	3 00	3 00	3 10	3 65	3 25
Plymouth, R. A.	....	....	3 00	3 10	3 75	3 35
Susque: Coal Co., (S.H. Brown & Co.,) at Amboy	2 80	2 80	2 80	2 95	3 50	3 20
Kingston at Hoboken	2 85	2 85	2 90	3 00	3 60	3 25
Pittston at Newburgh :						
A. S. Swords	2 85	2 85	2 85	2 95	3 50	3 25
Penn. Coal Co.	3 10	3 10	3 10	3 20	3 60	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 65	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 65	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 65	3 25
Lehigh Coal Exchange "	3 75	....	3 25	3 25	3 75	3 50
Honey Brook Lehigh	3 75	....	3 25	3 25	3 65	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 65	3 25
Mount Pleasant at Hoboken	3 75	....	3 15	3 15	3 50	3 30
Cross Creek at Elizabethport	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals at Port Richmond, Philadelphia.						
Schuylkill white ash	2 75	2 75	2 60	2 65	3 25	2 75
Schuylkill red ash	....	....	....	2 75	3 35	2 75
Lorberry	....	....	3 60	3 60	3 60	3 00
Lykens Valley	....	....	4 15	4 15	4 15	3 30

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York..35@40c.
" " Elizabethport & Port Johnston to N. Y..35@40c.
" " South Amboy to New York. .....35@40c

Freight by the boats of the companies from Hoboken, Rondout, Port Johnston, Weehawken, South Amboy and Perth Amboy to New York City and vicinity 50c.

Pittston coal at New York or Brooklyn delivered by Penn. Coal Co.'s boats 60c. per ton additional.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 63
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland, at Georgetown and Alexandria, Va	3 50@3 75	5 20
Cumberland, at Baltimore	3 75@3 90	5 00
Clearfield f.o.b. Canton, Baltimore	3 50@....	5 00

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 90c.@1 f.o.b, at Greenwich, Phila., for Eastern and foreign shipments, per 2240 lb. $3 25@3 35 for Sound ports, 3 50@3 65, f.o.b., at South Amboy, N. J., per 2,240 lb., $4 10@4 75. Discharged, in New York, per 2,240 lb., $5 00 @5 15.

Foreign Gas Coals.

	Sterling.	Am. cur cy,
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	1 75	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pciuot, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$3 90	$4 20	$3 90
Lackawanna coal, in yard	3 50	4 00	3 90
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd..	5 50	5 50	5 00
Schuylkill Red Ash, del'd	5 25	5 50	4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 4c cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb				$18 00
Liverpool House Cannel	"	"	"	.... 18 00
American	"	"	"	.... 11 00
Cannelton Block, or splint,	"	"	"	.... 10 00
American Orrel	"	"	"	....11@14
Red Bank Cannel	"	"	"	.... 10 00
Cumberland	"	"	"	 00

Boston, Mass. March 10, 1877.

Coal—The market continues very quiet, at the same prices as a week ago. Freights have ruled easy, but at the close are a trifle firmer, on account of the storm. Receipts have been moderate, but the supply is ample.

There has been a good demand for coal for shipment from Philadelphia to Cuba and the West Indies since the opening of the year, or rather since the river became clear of ice. The shipments have been of both anthracite and bituminous, chiefly of the latter, and largely to Cuba. Eight or ten years ago the total exports from this port to the island were not over 500 tons; last year they were about 30,000 tons to Cuba, and about 7,000 tons have cleared this year, or since the ice embargo was raised, while between 3,000 and 4,000 tons more are loading, thus making over 10,000 tons so far this year in less than two months. At the rate for the two first months of the year, the exports for 1877 will be just double what they were last year, or 60,000 tons. There is no reason to doubt that the same or a similar ratio of increase will be found to exist throughout the West Indies.

We quote Boston wholesale price as follows:

Anthracite, broken	4.75@5 00	Cannel, English	16.00
do egg	4.75@5.00	Do. Buckeye	10.00
do stove	5.25@5.50	Lingan	4.75@5.00
Cumberland	6.00	Pictou	5.50
Clearfield	5.50	Penn	6.50
Westmoreland	5.75	Youghiogheny	5.25@6.25
Caledonia	4.50@4 75		

—*Commercial Bulletin.*

Chicago, Ill. March 13, 1877.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	8 00	Wilmington & Ill.	3 50@ 4 25
" Grate & Egg	7 50	Blossburgh	7 00

Cincinnati, O. March 14, 1877.

Specially reported by the Consolidated Coal and Mining Co.

Market here for soft coal has been depressed by heavy receipts of Youghiogheny from Pittsburgh, and prices are fully one cent per bushel lower than last week. No change in prices for anthracite.

	Per bush.	Per ton 2,000 lb.
Youghiogheny lump afloat	7@7½c.	$1 94
" nut "	6c.	1 62
" slack "	5c.	1 32
Camden, W. Va. "	6c.	1 67
Kanawha, " "	7@7½c.	1 94
Delivered to consumers 4 c. per bush. more than above prices.		
Peytona cannel "	15c.	4 26
Youghiogheny coke "	4½c.	2 25
Youghiogheny lump delivered	12c.	3 33
" nut "	10c.	2 75
" slack "	7c.	1 89
Camdem, W. Va. "	10c.	2 78
Peytona cannel "	18c.	5 14
Kanawha "	12c.	3 33
Youghiogheny coke "	8c.	4 00
Wilkes-Barre Anthracite delivered, all sizes	—	8 00
" " " on cars "	—	6 70
Schuylkill, delivered		8 00
Lehigh anthracite delivered	—	8 50
" " on cars	—	7 50

Cleveland, O. March 13, 1877.

Specially reported by Messrs. LAMBIE & BATES.

Below we give you prices of coal as near as we can judge from the tone of the shippers, as navigation has not yet opened. Our quotations may vary some, as no sales have yet been made for the lake trade.

As the largest Briar Hill interests have been consolidated it would seem to indicate a steadier tone in the market for the ensuing season. The losses in the shipping trade were so heavy last year on sales of coal, owing to numerous failures in the trade, that better prices must be obtained in order to compensate for the risk. Increased caution, shorter time, and a closer scrutiny of credits will undoubtedly be the rule. The heavy shortage claimed by the receivers of coal has determined many of our shippers to sell only on the bill of lading, making all settlements dependent on railroad weights. Much of this coal has been sold at absolute cost on board vessel, and all shortages allowed have been a total loss, and have been a heavy drain on the capital of the shipper.

The long, cold winter has so reduced the stocks of coal all over the country that there will undoubtedly be an active demand on the opening of navigation. Freights will probably rule higher than they did last season.

Per ton of 2000 lb. f. o. b. vessels

WHOLESALE.

Briar Hill (Church Hill)	3 50
" " No. 2 Grades	3 35@3 40
Straitsville Lower Vein	2 90
Hocking Valley	2 90
Massillon	2 90
Mineral Ridge (Cambria Mine)	2 90
Tuscarawas Valley	2 40
Columbiana	2 40
Nut coal, various grades	2 20@2 50
Screenings, " "	1 35@1 75
Youghiogheny gas coals	3 75@3 85

The following are the prices established by the Coal Exchange until further notice:

RETAIL.

	1 to 10 tons.	10 tons upw'd.
Brier Hill lump	$3 25	$4 00
" " nut	4 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, l'p.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

New Orleans, La. March 12, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl.	40@42½c.
" steamboats, per bbl.	65c.
" to manufacturers, per bbl	65c.
" to families	85c.
" shipments, per hhd	$7 00
Anthracite, wholesale, per ton	7@8 00
" retail, "	11 00
Virginia Cannel, retail, per bbl	1 25
Scotch " "	....
Mt. Carbon, wholesale, per bbl	...
" " retail, "	....
St. Bernard wholesale, per bbl	—c.
" steamboat	62c.
" retail "	75c.

Philadelphia, Pa. Mar. 15, 1877.

From our Special Correspondent.

The trade here has been waiting from day to day for the tolls on the Reading. The delay in making them public has been interpreted by many as indicating negotiations for a new combination, but there seems to be no foundation in that expectation. The rates will surely be made known this week. The sudden determination of the Pennsylvania Coal Company to sell next week, in one day, as much as they can produce in two months, is evidently a piece of temper like the sale of last August, and it is to be hoped the punishment will be the same. This constant trifling with such an important interest as the coal trade by the men who have attempted to control it at a time when caution and forbearance should prevail, is a very powerful argument in favor of the power given to common carriers to mine and sell coal as well as transporting it being curtailed. It certainly was a grave mistake to grant such a power at any time. Millions of dollars are sacrificed to the personal feelings of those who are fighting with the money entrusted to them by others for no such purpose.

What little is now doing is done by the companies. With the exception of the city and line trade, which is unusually dull for the season of the year, the individual operators are doing nothing and waiting the result of the struggle.

Freights continue to rule low for the season. To Southern ports the rates are weaker; Washington, 75c.. and Norfolk, 65c. to 70c.

Pittston, Pa. March 13, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional

Richmond, Va. March 13, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

San Francisco, Cal.

From the *Commercial Herald*, March 8, 1877.

COAL—Imports from Jan. 1st to March 1:

	Tons.		Tons
Anthracite	2,529	Mt. Diablo	10,051
Australian	15,473	Vancouver Island	14,875
Coos Bay	4,777	Rocky Mountain	43
Cumberland	4,124	Seattle	15,600
English	8,121	Bellingham Bay	1850

Receivers of California (Mt. Diablo), Steam, Wellington, and other Pacific Bituminous mines are making strenuous efforts to extend the sale thereof for household purposes. There is none better than the Wellington, which is cleanly as compared with some others. Seattle and Nanaimo are largely used by steamers within the range of $8@9. Thus far during the winter season the demand for house coals has been exceedingly light, owing to the extraordinary mild and open weather. Scotch and English cargoes do not command cost and freight, although there is an improved demand for English steam cargoes to arrive, prices having risen from $7.50 to $8.50; Scotch, $8.50; West Hartley, $9; Wallsend, $9; Australian steam $9@9.25; California (Mt. Diablo), $5.75 for screenings, and $7.75 for coarse.

St. Louis, Mo. March 13, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

Lackawanna	$9 00@10 00	Schuylkill	9 00@10 00
Wilkes-Barre	9 00@10 00	Lehigh	10 00@10 50

BITUMINOUS.

Blossburg	9 00	Big Meadow	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	8 50

Toledo, Ohio. March 13, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Ton of 2,000 lb.

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut.	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Montreal, Canada. March 13, 1877.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$5 00	Cape Breton Steam	
Pictou "	4 75	Newcastle Smiths,	

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 50	Chestnut	
Stove	7 00		

Toronto, Canada. March 13, 1877.

Scranton and Lackawanna, Grate and Egg	$5 50
" " " Stove	6 00
" " " Chestnut	5 75
Lehigh Lump	7 00
Soft coals (Briar Hill and Massilon) screened for house use	6 00

Freights

Representing the latest actual charters up to March. 8, Per Ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	...	....
Alexandria	80	....	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	....	....	....
Bath, Me	....	....	....	1.15-1.25
Baltimore	55	....	....	....
Boston, Mass	1 45@1 56	....	....	1.20-1.25
Bridgeport, Ct	....	....	....	50
Bristol, R. I	....	....	....	80
Cambridgeport, Mass.	1 75	....	...	....
Cambridge, Mass	1 50	....	....	....
Charleston, S. C	1 25@1 40	....	....	....
East Cambridge	....	....	....	....
Fall River	1 17½@1 20	....	....	80
Gloucester	1 45	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	....	....	....
Hoboken	....	....	....	35
Hudson	....	....	....	....
Jersey City	....	....	....	35
Lynn, Mass	....	....	....	1 30†
Middletown	....	....	....	90
Mystic	....	....	....	....
Newark	....	....	....	....
New Bedford	1 40	....	....	85
Newburyport	1 65	....	....	1 40
New Haven	....	....	....	50
New London	....	....	....	65@70
Newport	....	....	....	80
New York	....	....	....	35
Norfolk	70	....	....	75
Norwalk	....	....	....	50
Norwich	....	....	....	....
Pawtucket	1 32	....	....	70
Philadelphia	....	....	....	....
Portland	†1 20	....	....	1 25
Portsmouth, N. H.	1 70	....	....	1 40
Providence	1 20@1 25	....	....	80
Poughkeepsie, N. Y.	....	....	....	....
Richmond, Va	80	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	....	....	....	1.25-1.30
Savannah, Ga	1 50	....	....	....
Stamford	....	....	....	60
Stonington	....	....	....	75
St. Johns, N.B	....	....	....	...
Taunton	....	....	....	...
Troy	....	....	....	....
Warren, R. I	....	....	....	....
Wareham	....	....	....	....
Washington	75@90	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....

*And discharging and towing. †And discharging. ‡And towing. § 3c. per bridge extra.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, March 16, 1877.

American Pig.—The Thomas Iron Company reports sales of 600 tons of its iron at our quotations. In addition to some further business in a small way at quotations, we are reported 1,000 tons of Nos. 1 and 2 foundry iron at $19 and $18 per ton respectively. The production is large, the demand small, and the financial necessities of some of the furnace companies pressing, so that as a consequence we have a weak market. We continue to quote nominal and very weak, as follows: No. 1 foundry, $20; No. 2 foundry, $19, and forge, $17.50@$18.

Scotch Pig.—There is but very little business doing in this article, transactions being entirely confined to small lots. We quote Eglinton, $24.50@$25; Coltness, $26.50, and Glengarnock, $26.

Rails.—We are reported sales of 4,000 tons of steel rails, for delivery from Amboy, on private terms. Some of the steel mills are very well supplied with orders and are a little firmer in prices. It is reported that the Johet mills have been leased to Messrs. A. B. Meeker & Co., of Chicago, for a term of five years, at an annual rental of $150,000. We continue to quote at mills as follows: steel rails, $48.50@$50, and iron at $33@$37.

Old Rails.—There are some negotiations in progress, but in the absence of business prices are quite nominal, $18 being bid and about $19 asked.

Scrap.—There has been nothing done in this. We quote No. 1 wrought at $26.

Baltimore, Md. March 14, 1877.

Specially reported by Messrs R. C. HOFFMAN & Co.

The iron market remains quiet, with moderate demand—prices remaining about same as last quotations, as follows:

Baltimore Charcoal	$29@32	Mottled and White	$16@17 00
Virginia Charcoal	28@32	Charcoal C B. Blooms	60@62 00
Anthracite No. 1	21@22	" " Belletts	65@67 00
" No. 2	20@21	Refined Blooms	50@52 00
Anthracite No. 3	19@20		

Boston, Mass. March 10, 1877.

Pig iron has had a little movement. We quote $23 50@24 for No. 1, $23 for No. 2 and $22@23 for grey forge. Scotch pig is dull. We quote Coltness $28; Glengarnock $26 50, and Eglinton $26. English cable advices report a firmer feeling at the beginning of the week, but at the close prices there are weaker.

Bar is dull, quoting $47@48 for refined and $38@39 for common. Nails are in light demand. Rails have quieted down.—*Commercial Bulletin.*

Buffalo, N. Y. March 15, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington Street.

Prices per Gross ton at Buffalo.

ANTHRACITE.

No. 1 Foundry	$23 00@23 50	—4 mos
B 1 "	22 00.	—4 "
No. 2 "	21 00.	—4 "
Gray Forge	20 50.	—4 "

LAKE SUPERIOR CHARCOAL IRONS.

No. 1	$26 75.	—4 mos
No. 2	25 75.	—4 "
No 3	25 25.	—4 "
No. 4	25 25.	—4 "
No. 5	25 75.	—4 "
No. 6	26 25.	—4 "

AMERICAN SCOTCH—CHERRY VALLEY.

No. 1	$25 50.	—4 mos.
B 1	24 00.	—4 "
No. 2	23 00.	—4 "

One dollar off for cash.

Chattanooga, Tenn. March 12, 1877.

Specially reported by J. F. JAMES. pig iron broker, etc., 233 Market Street.

There has been a slight improvement in demand and sales of pig metal during the past week. Many of the foundries, South, that have been idle for some three or four months have resumed operations, and report a fair amount of orders on hand. This movement affects our market to a considerable extent, and when business is at all brisk the amount of pig iron consumed at the forty-three foundries scattered throughout the South is quite large. Outside the more than usual weekly average of car-load lots I note sales of 20 tons cold blast and 100 tons of standard, one foundry, for consumption at New Orleans. Prices have undergone no change.

Tenn. Ala. and Ga. Charcoal,	No. 1 foundry	$20@	22
" " " "	No. 2 foundry	19@	20
" " " "	gray forge foundry	16@	17
" " " coke,	No. 1 foundry	20@	21
" " " "	No. 2 foundry	18@	19
" " " "	gray forge foundry	16@	17
Charcoal or Coke, White and Mottled		15@	—
Tennessee, Alabama and Georgia cold-blast car wheel.		22@	28
Old Rails		18@	19
Old car wheels		16@	17
Wrought Scrap, No. 1		17@	—
" " " 2		12@	—
Cast Scrap		1c@	—
Muck Bar		32@	33

Iron Ores.

Red Hematite (about 55 per cent. metallic iron), f.o.c. et mines	1 25
Brown Hematite (about 25 per cent. metallic iron)	1 75

Cincinnati, Ohio. March 13, 1877.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The demand for pig iron is fair and prices are firm at quotations. Good brands of charcoal irons are getting scarce, while coke and stonecoal irons are in ample supply. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$25 00@	—4 mos
" No 2, "	24 00@	—4 mos
" Mill	22 00@23 00	—4 mos
" Soft Silver Gray	21 00@22 00	—4 mos
Tennessee, No. 1, Foundry	23 00@23 50	—4 mos
Tennessee, No. 2, "	22 50@23 00	—4 mos
" Mill	21 00@22 00	—4 mos
Missouri, No. 1, Foundry	@	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@23 00	—4 mos
" No. 2, "	21 50@22 00	—4 mos
" Soft Silver Grey	21 00@21 50	—4 mos
Ohio Mill	20 50@21 00	—4 mos
Missouri, No. 1 Foundry	25 00@	—4 mos
" No. 2, "	23 00@23 50	—4 mos
" Mill	21 00@22 00	—4 mos

CAR-WHEEL.

Hanging Rock, C. B	38 00@43 00	—4 mos
Tennessee "	30 00@32 00	—4 mos
Missouri "	30 00@33 00	—4 mos
Alabama "	28 00@32 00	—4 mos

BLOOMS.

Charcoal	55 00@ 60 00	—cash

SCRAP IRON.

Cast	50c.@1 00	—cash
Wrought	1 00@1 40	—cash

Cleveland, Ohio. March 13, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 00@
No. 2, " " "	25 00@
No. 1, Anthracite	24 00@
No 2, "	23 00@
No. 1, Bituminous	24 00@
No. 2, "	22 00@
American Scotch, No. 1, Cherry Valley	24 00@
" " B—1, " "	23 00@
" " No. 2, " "	22 00@
No. 1, Massillon	24 00@
B—1, "	23 00@
No. 2, "	22 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 00@....
No. 4 " " "	27 00@....
Nos. 5 and 6 "	27 00@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 00@....

FORGE IRON.

No. 1, Gray	21 00@....
White and Mottled	19 00@....

Louisville, Ky. March 13, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

Foundry irons are becoming scarce, and are held very firmly at advanced figures. We revise quotations accordingly.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$25 00@25 50
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	22 00@22 50
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	21 00@21 50
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	23 00@23 50
No. 1, Mill, from " " " "	21 00@22 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	23 00@23 50
No. 2, " " " "	21 00@22 00
No. 1, Mill, " " " "	21 00@22 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	20 00@20 50
No. 2, " " " "	19 50@20 00
No. 1, Mill, " " " "	20 00@22 50
No. 1 Foundry, from Missouri Ores	24 00@24 50
No. 2 " " "	23 00@24 50
No. 1 Mill, from Missouri Ores	23 00@24 50

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	37 00@40 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	28 00@35 00
" " Kentucky Ores	28 00@40 00

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending March 15, 1877.)

PIG IRON.—We report very little business; the demand has fallen off, though prices are held firm and all sales are at full quoted prices. We report sales of about 2,000 tons all brands, and quote No. 1 at $20 to $21; No. 2 $18.50 to $19.50; Gray Forge $17.50 to $20.

MANUFACTURED IRON.—The demand for all grades of manufactured iron has fallen off in the last ten days; in fact there is a duller feeling in it than we have had for some months. We quote bars dull at 2 1-10 to 2 2-10; plate and tank 2⅛c. to 7c., as to quality; skelp 2¼c. to 2½c. per lb.

RAILS.—We have nothing new to report in either steel or iron rails. We quote steel at $49 to $51; iron $36 to $40.

OLD RAILS are in some demand, but sellers still hold above the ideas of buyers, so we have a dead-lock; but it is felt that buyers will give in and the advance of one dollar a ton be obtained. We quote at $20 to $21.50.

SCRAP.—Wrought scrap is slow of sale, as also cast, at low prices. We report sales of 100 tons wrought scrap at $24. We quote wrought at $22 to $26; cast $14 to $19.

OLD WHEELS are in plentiful supply, and low prices are quoted. We quote at $18 to $20.

Pittsburg, Pa. March 13, 1877.

Specially reported by A. H. CHILDS.

The market has been less active during the past week, foundry metal being especially dull. Prices are unchanged, and the arguments of holders showing that any decline is impossible, are at least as convincing as those of purchasers endeavoring to demonstrate the improbability of an advance.

Richmond, Va. March 12, 1877.

Specially reported by ASA SNYDER, Esq.

I have no change to notice in best brands of charcoal pig iron. Two or three small outside lots have been sold under pressure at very considerably reduced figures. There is considerable inquiry for iron and coal lands in Virginia by capitalists from the north. Doubtless some tracts will be taken at the great sacrifice owners are willing to submit to.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " " 2 X	21 to 22
" " " " " " 3	20 to 21
" Anthracite 1 X	— to —
" " 2 X	— to —
" " 3	— to —

St. Louis, Mo. March 13, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

No material change has taken place in the condition of our market since last report. The demand continues good and prices are held firm at our quotations. We quote same as last.

CHARCOAL.

Missouri No. 1 Found'y.	$23@25
" " 2 "	22@23
" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26
" " " 2 "	23½@24
" " Gray Mill	23@24
Tenn. No. 1 Foundry	23½@24
" " 2 "	22½@23
" Gray Mill	22½@23

COKE.

Alice H. R. Ex No 1 F'y.	26 50
" " 1 "	25 50
B, " 1 "	24 50
" " 2 "	23 50
Forge	23 50
Chat., Tenn. No. 1 Fd'y.	25 00
" " " 2 "	23 50
" " Forge	22 50
" " White Mil'd	21 00

STONE COAL.

Missouri No. 1 Fd'ry.	25@24
" " 2 "	23@23
" Gray Mill	22@26
" White & Mt'd	21@22

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron $2 25, rates.	
No. 1 Wrought Scrap 95c. cwt.	
Heavy cast " " 70 "	
Light " " 40 "	

Montreal, Canada. March 6, 1877.

We quote: Pig Iron.—Gartsherrie, $22.00@22.50; Summerlee & Calder $21.00@21.50; Eglinton & Clyde $19.50@20.00; Hematite $26.00@27.00. Bar, per 100lbs., Scotch and Staffordshire $2.00@2.10; best do., $2.20@2 30, Swedes and Norway $4.75@$5.50; Lowmoor and Bowling, $6@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Mar. 16, 1877.

Our report of the business in the several articles on this list do not show great activity, yet there is, nevertheless, the encouraging feature of a steady, although slow, improvement in trade.

Gold Coin.—During the week under review the price of gold has ranged from 104¼ to 105⅛, and closed at 104⅞.

Bullion.—Silver is lower and shows a decline of about 7c. an oz. since Feb. 1. This decline has been wholly owing to the subsidence of the demand from China and the East Indies, and from the further fact that Germany was a free seller at the recent higher rates. The market is still weak and has the appearance of receding still further in price. To-day's cable advices quote silver in London at 54¾d. per oz. We quote here at 118¼@120, while San Francisco quotes at 7⅛ per cent. discount.

Copper.—About 200,000 lb. have been sold at 19⅜c.@19¼c. It is said that 1,200 tons of copper have been sold for foreign account, supposed to be for Russia, particulars not being known. The closing prices are a little firmer, 19⅜c.@19¾c. being asked. Stocks in Europe and afloat for there on the 1st inst. were 36,483 tons, as against 36,463 tons Feb. 1st, 28,094 tons March 1st, 1876. Messrs. Vivian, Younger and Bond, of London, under date of March 2, say:

"Chili Bars have declined from £73 to £70 10/, and at the latter price a pretty considerable business was done. The total sales for the month are reported at 5,000 tons. At the close there are buyers of moderate quantities at £71 10/, but the appearance of the market rather indicates renewed dulness. The continued accumulation of stock abroad and at home exercises an unfavorable influence, and discourages the operators from continuing any holding of their stocks after they see the smallest possible profit on any purchases they may have made. This it is which causes any brighter prospects to be so quickly dispelled. On the 20th ult. at public auction the following sales were made: 615 tons Wallaroo at an average of £77 5/ 10d. for cakes, and £77 10/ for ingots, the whole sale averaging £77 6/ 6d. A further 400 tons were also sold (second hands) at £77 8/ 1d. for cake, and £77 10/ 6d. for ingots, the average being £77 8/ 5d. per ton. At the Swansea Ticketing on the 27th ult. 1,363 tons British and foreign ores sold at an average of 14/ 5½d. per unit for an average produce of 11¾ per cent. On the 19th instant the charters were cabled from Valparaiso as equal to 2,000 tons fine for the first half of February, 1,950 tons for England and 50 tons for the continent."

Tin.—There is a better business in a small way. The disturbances at the Straits settlements have not had any material effect either here or in Europe, although no quotations are being made at Penang. Cable advices to-day quote Straits, in London, at £72@£72 10/. We quote here, in gold, per lb., as follows: Straits, 17c.; L. & F., 16¼c.; Refined, 16¾c.; and Banca, 19¼c.@19⅝c. for spot. Messrs. Vivian Younger & Bond say of tin: "The market for Foreign was steady during the early part of the month, and as spot parcels of Straits were particularly scarce, as high as 74/ was paid, while Australian was never marked above 72/. The market, however, soon relapsed, when the pressure to buy Straits to fulfil forward contracts was over, and prices declined under heavy supplies (chiefly of Australian), 72/ being the current quotation for Straits at the close, and Australian 70/ 6d. to 71/. English has been rather neglected, and common Ingots offer at 74/ 6d. The stock of Foreign tin in London and Holland is thus estimated:—

	1877. Feb. 1.	1877. Mar. 1.	1876. Mar. 1.
Foreign tin in London	7,865	8,605	6,907
Banca tin in Holland	1,450	1,048	810
Ditto (in Company's hands)	449	1,065	1,870
Billiton tin in Holland	930	1,010	1,090
	10,702	11,728	10,677
Quantity of tin afloat for Europe	4,500	4,200	3,700
Quotations on the same dates being for Straits per ton	£73 10/	£72	£73

Tin Plates.—An improving jobbing demand is reported. Prices are nominally unchanged, and as follows, in gold, per box: charcoal tins $6.75@$7, and ternes $6@$6.25; coke tins, $6 and ternes, $5.50@$5.75.

Messrs. ROBT. CROOKS & Co., of Liverpool, under date of March 1st, say of tin plates: "In spite of the extremely limited number of purchases made during the past month, prices do not show a reduction of more than 6d a box on some descriptions and 3d on others. This fact gives some strength to makers' assertion that there is little chance of cost being reduced sufficiently to enable them to manufacture at present prices to a profit. Charcoal tins still continue to be the most depressed, and are now obtainable in some instances at present lowest rates for delivery two or three months ahead. Sellers of cokes decline to book, except at an advance for shipment, later than end of March. Ternes, both charcoal and coke, figure out worse to manufacturers than tin, and only a few care to sell at current quotation."

Lead.—The large sale which we noted last week without full particulars, was 650 tons of Selby lead at 6⅛c. to arrive during the next 90 days. The business during the week has been in a small way at 6⅝c.@6¾c. The San Francisco *Commercial Herald* of March 8 says: "The *China* for Panama en route to New York carried 750,632 lb. of pig lead.

Spelter and Zinc.—Spelter remains as at has been for some time, quiet at 6½c.@6⅝c. currency. Domestic sheet zinc is quoted at 7⅛c.@7¼c. currency.

Antimony.—There is but a moderate business doing in this. We quote at 12¾@13c. gold.

Quicksilver.—Prices are unchanged. London quotes £7@£7 5/ per flask, and San Francisco, 43½@44c. per lb. The quotation in this market is only nominal.

The San Francisco *Commercial Herald* of March 8 says of quicksilver: "For some weeks past prices have been very irregular, competition great, and no concert of action whatever among prominent receivers, and brokers running hither and thither, offering at every corner to undersell their neighbors. Recent purchases for export to China and elsewhere ruled at 44 cents down to 43½@43 cents, and it is possible that some lots were even placed at 42½ cents. This is the natural result of a wide distribution of the article among merchants, all under orders to sell upon arrival. At this writing we cannot quote it higher than 43 cents. The Australian steamer carried 165 flasks, the China steamer 1,279 flasks."

The Salt Lake City Ore and Metal Market.

Telegraphic advices from Salt Lake City, dated March 16, give the following prices for base bullion and argentiferous lead ores:

Argentiferous Lead (Base Bullion).—$73¼ per ton for lead. $1.22½ per ounce for silver. $20 per ounce for gold. The quotation for silver is based upon the silver contents in the lead of 70 ounces per ton of 2,000 lb.

The *Inter Ocean's* correspondent under date of the 9th inst. says: "The weather seriously affects the ore and bullion business, and there is but little doing. The southern part of the Territory now promises to add very materially to our mineral production for the present year, and Leeds district, in particular, will produce largely in fine silver. Beaver County produces silver lead ores, much like our Bingham and Cottonwood ores, and her centr.butions will be in base bullion. The Utah Southern Railroad, that promises to extend to the latter districts, will bring much mineral property into valuable and paying properties. The Hon. Hugh McCulloch and Mr. Seligman of New York have been here en route for San Francisco. These gentlemen, I am told, desire to control the silver trade of the coast, but they cannot do it if it is to be done in the interest of the London market.

The Georgetown (Colorado) Ore Market.

Following is the scale of prices now prevailing for silver ores in Georgetown, Colorado:

BASIS:—Silver $1.25.			Premium on Gold $1.10		
50 oz. ore	47c.	per oz.	300 oz. ore	108c.	per oz.
75 "	66c.	"	350 "	109c.	"
100 "	84c.	"	400 "	111c.	"
125 "	90c.	"	450 "	113c.	"
150 "	95c.	"	500 "	114c.	"
175 "	97c.	"	600 "	115c.	"
200 "	100c.	"	700 "	116c.	"
225 "	102c.	"	800 "	117c.	"
250 "	104c.	"	900 "	118c.	"
275 "	106c	"	1000 "	119c.	"

The *Miner* of the 10th inst. says:

"One of the most encouraging features of this camp is that the facilities for selling every grade of ore that can be mined are unequalled by any other locality in the State. Low grade stuffs find ready sale at the various concentrating works at living figures. High grade ore is eagerly sought for by all our dealers, and brings prices that would surprise the denizens of slow-going camps, where there is no competition and but little capital invested in the business. Here no one need stop work for want of a market for his product. Buyers are ready and have plenty of money."

TELLURIDE GOLD ORES.

The following rates are advertised to be paid for telluride gold ores, delivered at the C. C. RR. depot in Boulder, Colorado:

Ores assaying	2½	oz. gold	$14.00	per ton.	
" "	3	" "	22.25	"	"
" "	3½	" "	31.00	"	"
" "	4	" "	40.00	"	"
" "	4½	" "	50.00	"	"
" "	5	" "	57.00	"	"

The value of the silver will be added to that of the gold. No charge for crushing and sampling the ore.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, March 16, 1877.

The coal shares have suffered a material decline during the week just closed, final prices to-day, however, show an improvement of about 2 per cent. from the lowest quotations of the week.

Delaware, Lackawanna & Western Railroad.—The dealings in this stock have been very large, the sales amounting to nearly 340,000 shares. The extreme quotations for the week were 63⅛@59⅞, closing at 60⅜. This company, on the 10th inst., discharged five hundred men between Hoboken and Scranton, including thirty at the Dover shops. Orders have been received at the various shops of the company in Scranton reducing the working force one-third and making a reduction of 10 per cent. in the wages. All the foremen and station agents employed by the company have been notified of a reduction in their wages, to take effect from the 1st of March. The wages of the foremen will be reduced $10 and of the station agents $5 per month. The reduction in wages is bitterly complained of by the employees, it being the fifth reduction of ten per cent. that has been made within the past fifteen months. A strike is threatened. At the present rate a skilled mechanic cannot earn more than six or seven dollars per week, while the wages of laborers amount to only 70 cents per day.

Cayuga Railroad.—Negotiations are said to be in progress for a lease of this road to the Delaware, Lackawanna & Western. The latter company has a line from Owego on the Erie north by west to Ithaca, 33 miles, connecting with the Cayuga road at Ithaca. The Cayuga runs from the last named place north by west to Cayuga Bridge on the New York Central, 38 miles. If the Delaware, Lackawanna & Western makes the lease it will, it is said, change its Ithaca and Owego line (which is still of six feet guage) to 4 ft. 8½ in. guage, and will complete the connection with the main line by laying a third rail on the Erie from Owego to Binghamptons, 22 miles.

Delaware & Hudson Canal Company.—About 47,000 shares of this stock have changed hands during the week at from 47 to 50½ per cent., closing at 48¾. We note the statement that the canal will be opened for business on the 10th proximo.

New Jersey Central Railroad. This stock does not show much change in price. The sales for the week amount to nearly 7,000 shares.

Senator Leon Abbett made application to Chancellor Runyon at Trenton this morning for an order to show cause why Judge Lathrop, receiver of the New Jersey Central Road, should not apply the earnings of the road to the payment of the back wages due their servants. A law of 1875 makes the payment of servants a first lien on the road. The petition alleges that the gross receipts of the road are from $300,000 to $350,000 per month, and the current expenses are $225,000 to $250,000 per month; that the receiver now has $50,000 in his hands of surplus earnings, and that during March he can pay $80 000 on account of the indebtedness to servants, and smaller sums from time to time thereafter.

St. Louis and Iron Mountain Railroad.—The annual report of the President of this company shows the gross earnings of the road for the past year to be a trifle over $4,000,000, the operating expenses a little over $2,000,000 and the net earnings $1,966,000. The increase of the gross earnings is about $200,000, and the decrease of the operating expenses about 12½ per cent.

St Mary's Canal Mineral Land Company.—The annual meeting of this company will be held in Albany, N. Y., on the 27th inst.

Royal Virginia Land and Railroad Company.—This company has completed its road from tidewater at Fredericksburg, Va., to Orange Court House, connecting with the Orange and Alexandria Railroad, a distance of forty miles, and trains are now running regularly. The company proposes to complete its road the coming summer across the Blue Ridge and the Shenandoah Valley to its anthracite coal fields, a total distance of 116 miles.

A Western Maryland Railroad.—We note the statement that a narrow gauge railroad to run from Confluence, on the Pittsburg & Connellsville Railroad, to Deer Park, on the Baltimore & Ohio Railroad, is proposed. Hon. H. G. Davis, of West Virginia, and a number of Pennsylvania capitalists, who own large tracts of coal, mineral and timber lands at intermediate points in the interior of Garrett County, are the projectors.

The Union Pacific Railroad has declared a dividend of 2 per cent., payable April 2.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 16th inst., are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

	—Quotations.— Highest.	Lowest.	Closing.	Sales Shares.
American Coal Co	—	—	25	—
*Cambria Iron Co	—	—	60	—
*Pennsylvania Salt Manuf. Co.	—	—	67	—
St. Louis, I. M. & S.	11	11	8	25
Spring Mountain Coal	—	—	50	—

BONDS.

D., L & W. 7s, Convt., 1892	—	—	103⅝	—
" " 2d mtge., 1881	105¾	105¾	105½	2,000
N. J. C., 1st mtge., new	103½	103¼	103	12,000
" " 1st mtge., cons.	56¾	53	51½	79,000
" " Convt.,	50½	47	46½	68,000
L. & W.-B. Coal Co., cons.	35⅛	33	32	37,000
Am. Dock & Imp. 7s	44½	41	40	9,000
D. & H. C. Co., 1st m., 1884	98	95	94	32,000
" " " " reg., 1891	99⅞	97	96	39,000
" " " " 7s, 1877	—	—	94½	—
" " " " reg. & con., 1894	—	—	91	—
St. L. I. M. & S., 1st mtge.	98½	98	97½	22,000
Ches. & Ohio, 1st mtge.	—	—	23	—
*L. V. RR., con. mtge., 6s, 1923	96¾	96½	95¾	18,000
" " 2d mtge., 7s, 1910	108⅛	107	107	5,000
" " reg. & cou., 1898	108	—	106	1,000
" " 1st mtge., 6s	—	—	—	—
*P. RR., 1st mtge., 1880	104¾	—	104½	4,000
" Gen. mtge. reg. 1910	107½	—	107	11,000
" Con. m. 6s. con. & reg. 1905	—	—	—	—
*P. & R. RR. 7s, 1893	—	—	105	—
" " con. m. 7s. cou. 1911	93½	93¾	93¼	15,000
" " Deb. 6s, 1893	—	—	46	—
" " New convt. 7s	50	—	50	1,000
" " Con. mtge. 7s reg.	93½	—	93¼	5,000
" " 6s 43-80	—	—	101	—
*P. & R. C. & I. Co. Deb. 7s	50	—	50	34,000
*L. C. & N. Co. 6s. 1834	101	—	101	300
" " RR. loan, '97	100	—	100	2,800
" " Con. mtge. 7s	—	—	—	—
" " Convt. gold, 1894	96½	—	96⅜	1,500
Gold loan, 1897	88¼	88	87¾	8,500
*Schuylkill Nav., 6s 1897	—	—	79	—
*Pa. and N. Y. Canal, 7s	107	—	—	1,000

Total transactions for the week $408,100

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, March 16, 1877.

The prices of coal stocks at Philadelphia generally show quite a decline. The transactions for the week amount to about 150,000 shares.

Pennsylvania Railroad.—This stock has ranged from 88 to 82¾ per cent., and closed at 84 per cent., with sales of 95,000 shares. Various rumors were circulated during the week intended to depress the stock, among which was one that the company at its meeting would recommend a reduced dividend. Col. Scott telegraphs in response to an inquiry on the subject: "You may contradict the rumor in the most absolute form. The meeting was entirely harmonious. Report accepted, adopted and approved, and no reference to any reduction whatsoever."

Reading Railroad Stock has ranged from 26 to 24⅞, and closed at 25¼ per cent., the sales amounting to 12,000 shares. It is stated that this company, which, during the past winter, has been deferring payment for materials incident to its business by memorandums or certificates running three to four months, will, on the 1st of April, pay in cash as heretofore for all materials purchased. This indicates a recovery of the credit of this great corporation, which will prove alike gratifying to creditors, stockholders and the public. The total amount of these memorandums, of both the Reading Railroad and the Reading Coal and Iron Company, now outstanding, is but $185,000, the whole of which, besides paying cash for current supplies, will be paid and wiped out within three months.

Lehigh Valley Railroad stock is lower. The final price of 83 showing a decline equal to 7 per cent. for the week. The sales have amounted to about 7,000 shares.

The Lehigh Valley Railroad Company has declared a quarterly dividend of 1¼ per cent., or 75c. per share, equal to 6 per cent. per annum, amounting to $405,643. This is a reduction from 8 per cent., as formerly paid by this company.

The Mount Farm Coal and Oil Company has declared a quarterly dividend of 2 per cent.

Shafton Coal Company.—Eight shares of this stock were sold at auction during the week at $20 per share.

Chesapeake and Delaware Canal Company.—$2,800 of the 6 per cent. bonds of this company were sold at auction during the week at 77¼ per cent.

Morris Canal and Banking Company.—The annual meeting of this company will be held in Jersey City on the 2d proximo.

Westmoreland Coal Company.—The annual meeting of this company will be held on the 4th of April.

Catawissa Railroad Company.—The annual meeting of this company will be held on the 3d of April.

Cambria Iron Company.—The par value of the stock of this company has been changed from $12½ to $50 per per share by exchanging four shares of the old for one share of new stock.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING March 15, 1877.

The market is quiet on everything, especially so on mining stocks. No matter how low good stocks sell, they fail to attract the outside public; how long this is to last is what we would all like to know. We think we see a favorable turn in them, but they slump before you can turn around.

Allouez is stronger, on the assurance that the mine is actually looking better. There is, however, little doing in it here since the removal to New York. Calumet holds its own fairly, and sells in the neighborhood of $180, but only at retail. A large order either way would affect the price materially. The Copper Falls report that they have found a mass of some 6 tons, and more in sight. The stock is slightly better at 3⅜ bid. Duncan is quiet, sales being made at between 6½ and 5⅞, and is offered at 5⅞ at close. Franklin is weak, 11 being the best bid; could probably be bought at 12. Their product last month was something over 116 tons. Quincy is rather heavy than otherwise. Their annual report was not exactly what some of the stockholders had hoped it would be. Their supply is some $20,000 less than it was one year ago. In the small coppers there is nothing doing.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, Mar. 16, 1877.

Some months ago, when the American Mining Stock Board was organized, we welcomed the fact as a sign of a growing interest in mining securities, and we pointed out what in our opinion is the only foundation for a permanent revival of interest in mines, and, consequently, the necessary condition of success for the new Board, viz., honest, legitimate dealings in good dividend mines.

Mining investments, when made with that care and prudence which successful business men exercise in all other classes of investment, are unquestionably the most profitable that capital can be employed in, but it too often happens that prudence is altogether forgotten by investors when dealing in mines, and the opportunities for deception are also so numerous that what should be a safe and exceedingly profitable field for the use of capital, comes to be classed in the same category as gambling and games of chance.

In our issue of October 14th we raised our voice against the disreputable transactions in the Grant mining stock, which were converting the new Mining Stock Board into a kind of mock auction. There is no doubt our remarks had the effect of weakening public confidence in the Board; and as that and other warnings previously given by us prevented the success of the objectionable scheme, and called the attention of the better members of the Board to the abuse then existing, we have the satisfaction of knowing that the good though unpopular seed then sown is bearing good fruit. A reaction has set in, and the broker who was most active in making the "washed" sales has been dropped from the Mining Exchange, and Grant has been ordered off the call-list.

We welcome these signs of appreciation of the first requisites for a successful revival of interest in mining investments, and trust the good work will not stop here. The mining stock exchanges and every reputable broker have all to lose and nothing to gain by such transactions as those we denounced.

No permanent interest in mining securities can possibly be created except by confining transactions to *bona fide* mines, and by familiarizing our capitalists with good dividend paying companies. It were better that some good mines should sometimes be unjustly excluded from the call-list than to admit those which can only bring disappointment and disgust to whoever invests in them, though every one, of course, understands the difficulty or impossibility of altogether preventing improper transactions.

There is certainly a very rapidly growing interest in mining stocks in this market, and it has every appearance of becoming permanent. A number of valuable or promising mines are now quoted, and legitimate transactions are already quite large.

We are pleased to note that the bonanza and other Comstock mines are left severely alone. It is quite unsafe for any one outside the charmed circle of the company management to deal in these stocks, as has recently been demonstrated in these columns by one of our San Francisco correspondents. We have it now reported that the bonanza "kings" are preparing a "see saw" between Consolidated Virginia and California. California is up at present, producing largely of very rich ore, while Consolidated Virginia is down, its product having fallen considerably. We are told that a large amount of dead work is being done in this mine, and only the poorer ore is sent out. As soon as the "kings" get the stock sufficiently depressed they will buy it in and commence rushing out the rich ore, while California is to drop gradually into lean ore and dead work till the proper time comes for it to go up again.

Of course there is a limit to this, for the bonanza will give out; but as no one outside of the management is allowed to know when this is likely to take place, buying such stocks is like playing against an opponent who uses loaded dice.

We are making arrangements to give very full reports of the transactions of the two mining boards, and to furnish, through our corps of special correspondents—who are mining engineers of high repute—information concerning the several mines dealt in, as well as of others which may be worthy the notice of capitalists.

The Virginia, North Carolina, Georgia, Massachusetts, Vermont, and Canada mines are likely to come into favor on account of their accessibility, though their richness of Colorado and Utah bonanzas will always give a charm to the mines of those favored regions.

Those stocks that have transfer offices in this city and are non-assessable are likely to be the favorites in this market.

If none but the best mines and those best conducted be entered on the mining list, there is no reason why mining investments should not become even more popular than railroad and other investment shares. Late developments show that *bona fide* dividends in the one class are as likely as in the other, while in mining, when paid, they are usually very large. For speculation purposes the one answers the object as well as another, the fluctuations per share varying but little in either case, while mining shares in this market are likely to be on the basis of $10 per share, as against $100 per share of railroad stock, thus requiring a much smaller capital to operate upon.

HUKILL.—This stock has been the feature of the week, very great excitement having occurred upon its first introduction on Monday, followed with but little less on Tuesday, and very liberal attention during the whole week. The first sale of the stock was 1,800 shares at $3¼ regular, advancing to $3⅞ on the first call, and closing for the day at $4⅛, with sales of over 23,000 shares. The sales for the week aggregate 67,025 shares ranging from 3⅛ to 4⅛, and closing at 4¼. This company was originally organized under the general mining laws of Colorado, with a capital of $1,000,000, divided into 10,000 shares of $100 each. It has since been re-organized under the laws of New York, with the same

COAL TRANSPORTATION AND MINING STOCKS.

(New York and Philadelphia.)

	Amount of Cap. Stock.	Shares issued.	Date, percentage and amount of last dividend.	QUOTATIONS *g*														SHARES SOLD.
				Sat.		Mon.		Tues.		Wed.		Thurs.		Fri.		Cl'g.		
				H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	H'gst.	L'st.	Bid.		
Consolidation Coal Co	$10,250,000	102,500	Jan. 1, '77, 2½	....	....	....	....	—	—	....	....	....	....	....	....	....	....	....
Delaware and Hudson Canal Co	20,000,000	200,000	Aug. 1, '76, 4	50½	49⅛	49	47	48¼	47	48¾	47½	49⅜	48	49	48½	48¾	46,683
Delaware, Lackawanna and W. RR. Co.	26,200,000	524,000 *c*	April 20, '76, 2½	64,230	63½	62½	62	60	61	59⅞	60⅝	59½	61⅜	59⅞	60¾	60	60⅛	338,322
Lehigh Coal and Navigation Co	10,448,550	208,971 *c*	June 3, '76, 1½	204,971	43¾	42	44¼	42	42½	42	44	42¾	45	44	....	....	43½	34,588
Lehigh Valley RR. Co	27,042,900	540,858 *c*	Jan. 15, '77, 2	540,858	89½	83½	88	82	83½	80	83	80½	83⅛	83	....	....	83	6,604
Maryland Coal Co	4,400,000	44,000	Jan. 31, '76, 1½	66,000	10	....	10	....	10	....	10	....	10	....	....	....	10	....
New Jersey Central RR. Co	20,600,000	200,150	Apl. 20, '76, 2½	515,200	9	8¾	9	8½	9	8⅞	9⅜	8¾	9½	9	9⅛	9	9	8,890
Pennsylvania Coal Co	5,000,000	100,000 *c*	Feb. 1., 77, 5	250,000	200	....	....	195	....	....	....	....	....	....	....	....	....	65
Pennsylvania RR. Co	68,868,700	1,377,404 *c*	Nov. 26, '76, 2	1,377,374	88	87½	88	86	85¼	82¼	85½	84¼	85⅜	85¼	....	....	84	95,168
Philadelphia and Reading RR. Co	34,278,755	685,554 *c*	Jan. 18, '76, 2½	†856,9541	25¾	24¾	25	25	25	24¼	25¼	25	25¼	25	....	....	22	12,155

Total sales for the week.....542,472

MINING STOCKS,

New York.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	These quotations are in currency, and in the absence of final bid prices are based on the latest sales as they occur during the operations of each day.						
									Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	
Alpha Cons G. S	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75. $1.	....	.....	$	$22 00	$	$	$20 12½	$19 25	1,100
Belcher, G. S	Nevada,	1,040	10,400,000	104,000	864,400	Feb. 24, '77, $1.	$15,397,200	April 10, '76, $1.	....	....	....	....	7 62½	7 00	500
Bertha Gold Co	Virgi'a.	645 acs.	300,000	30,000	**	.....	....	.....	11 37½	11 37½	11 50	11 00	10 50	10 25	2,900
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	236,992	Feb. 6, '77, $1	....	.....	....	....	....	....	....	....	....
Bullion, G S	Nevada,	943½	10,000,000	100,000	2,202,000	Jan. 15, '77, $1.50.	....	.....	20 12½	....	....	....	18 37½	18 37½	400
Caledonia, G. S	Nevada,	2,188	10,000,000	100,000	1,310,000	Feb. 10, '77, $1.	....	.....	....	....	....	....	....	....	....
California, G. S	Nevada,	600	54,000,000	540,000	....	.....	10,800,000	Feb. 15, '77, $2.	54 00	....	....	....	51 50	49 75	400
Centennial, G	Califor.	66 acres	1,000,000	100,000*b*	....	.....	....	.....	....	....	....	....	....	....	....
Chollar Potosi, G. S	Nevada,	1,400	2,800,000	28,000	1,289,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	71 25	....	....	....	68 00	67 00	650
Cleveland, G	Colo.	3,715	250,000	25,000*b*	**	.....	....	.....	9 50	6 50	6 00	6 12½	5 87½	5 62½	4,630
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....	....	....	.....
Cons. Imperial, G.S	Nevada,	468	50,000,000	500,000	125 00	July 25, '76, 25c.	....	.....	....	....	....	....	....	....	.....
Con. N. Slope & E.C.T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	....	....	....	....	....	....	.....
Cons. Virginia, G. S	Nevada,	710	54,000,000	540,000	411,200	June 11, '73, $3.	25,920,000	Dec. 11, '76, $2.	50 50	....	....	....	40 50	....	300
Confidence, G. S	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33⅓	....	....	....	....	....	....	....
Crown Point, G. S	Nevada,	600	10,000,000	100,000	1,273,370	Jan. 10, '77, $1.	11,588,000	Jan. 12, '75, $2.	....	....	9 25	10 12½	9 37½	9 62½	800
Douglas Mining Co	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	....	....	....	....	....	....	.....
Eureka Cons. G. S. L	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	....	....	....	....	....	....
Exchequer, G. S	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	7 37½	7 37½	7 12½	7 12½	7 00	....	6.0
Gould and Curry, G. S	Nevada,	621	10,800,000	108,000	2,134,000	Jan. 23, '77, $1.	3,934,800	Oct. 10, '70, $10.	....	....	....	....	....	12 25	100
Grant, G. S	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Granville Gold Co	N. Car.	9,000	1,000,000	100,000	**	.....	....	.....	3 25	3 37½	3 25	3 12½	2 87½	2 75	2,700
Hale & Norcross, G. S	Nevada,	400	11 200,000	112,000	2,354,000	Jan. 22, '77, $1.	1,598,000	April 10, '71, $5.	....	....	....	....	5 62½	5 75	3.0
Henry Tunnel Co	Nevada,	3,000	2,000,000	80,000	**	.....	....	.....	....	....	....	....	....	....	.....
Hukill, G.S	Colo.	3,288	1,000,000	100,000*b*	**	.....	20,000	Nov. 1, '76, $1	....	3 50	4 25	4 00	4 12½	4 50	67,025
Indian Queen, S	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons, G. S	Nevada,	3,000	11,000,000	110,000	220,000	Jan. 4, '77, $1.	....	.....	....	....	....	....	....	....	.....
Justice, G. S	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	....	....	....	....	....	....	.....
Kentuck, G.S	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	....	8 25	....	....	....	....	100
Kossuth, G.S	Nevada,	2,700	5,400,000	108,000*c*	405,000	Aug. 15, '76, 50c.	....	.....	....	....	....	....	....	....	.....
Leopard, G. S	Nevada,	1,500	5,000,000	50,000	50,000	March 31, '76, $1.	162,500	Dec. 15, '76, 50c.	5 12½	....	....	....	....	....	100
Lucerne Mining Co	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	2 00	1 87½	1 87½	1 62½	1 50	1 50	2,500
‡Mari. L. & M. Co., pre.	Cal.	4438? ac	5,000,000	50,000	1,350,000	Feb. 17, '77, $1.	....	.....	6 00	6 00	6 25	5 50	5 50	....	400
" " " com.	"		10,000,000	100,000	1,350,000	Feb. 17, '77, $1.	....	.....	5 50	5 50	6 00	....	5 25	....	200
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	.....	....	.....	....	....	....	....	....	....	.....
Merrimac, S	Mass.	1,500	500,000	50,000*b*	**	.....	50,000	March 10, '77, 10c.	6 62½	6 75	6 75	6 87½	6 75	6 87½	11,900
Mexican, G. S	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	....	....	....	....	....	....	.....
Morning Star	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, S	Nevada,	1,600	5,000,000	50,000	....	.....	1,050,000	Feb. 12, '77, $1.	....	....	....	....	....	....	.....
Ophir, G. S	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '04, $4.	....	....	....	....	25 12½	....	200
Original Comstock, G.S	Nevada,	....	10,000,000	10,000	5,000	Feb. 5, '77.	....	.....	....	....	....	....	....	....	.....
Overman, G. S	Nevada,	1,200	3,840,000	38,400*b*	2,222,280	Oct. 21, '76, $3.	....	.....	....	....	....	....	....	....	.....
Pleasant View, G	Colo.	1,200	200,000	20,000*b*	**	.....	....	.....	....	....	....	....	....	....	.....
‡Quicksilv. M.Co., pre.	Cal.	8500 acs.	4,293,3 00	100,000	....	.....	....	.....	24 00	....	....	23 00	24 00	....	300
" " " com.	"		5,708, 7 00	"	....	.....	....	.....	17 00	17 00	17 25	17 00	16 25	....	310
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	540,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	6 12½	....	....	....	....	....	400
St. Joseph Lead Co	Misson.	2600 acs.	1,000,000	100,000	....	.....	210,000	.....	5 50	6 00	6 37½	....	....	5 87½	600
Santiago, G. S	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, G.S	Nevada,	800	11,200,000	112,000	2,970,000	Jan. 27, '77, $1	4,460,000	June 11, '69, $3.	5 62½	5 37½	5 12½	5 00	5 12½	5 00	20,800
Seaton, G. S	Colo.	1,700	503,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Seg. Belcher, G.S	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	....	....	....	....	....	....	.....
Sierra Nevada, G. S	Nevada,	3,650	10,000,000	100,000	1,600,000	Feb. 15, '77, $1.	102,500	Jan. 16, '71, $1.	....	....	....	....	....	....	.....
Silver City, G. S	Nevada,	3,900	6,310,000	63,100	15,775	Nov. 16, '76, 25c.	....	.....	....	....	....	....	....	....	.....
Silver Hill, G. S	Nevada,	5,420	10,800,000	108,000	864,000	Feb. 6, '77, $1.	....	.....	....	....	....	....	....	....	.....
South Comstock, G. S	Nevada,	1,500	10,000,000	100,000	54,000	Jan. 30, '77, 25c.	....	.....	....	....	....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, G. S	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	....	....	....	....	1 12½	1 12½	1,000
Trenton, G. S	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. G. S	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	....	....	....	....	....	....	.....
West Belcher, G. S	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket, G. S	Nevada,	1,200	12,000,000	120,000	2,838,000	March 2, '77, $1.	2,184,000	Aug. 10, '71, $2.50.	....	....	....	....	....	....	.....
Young America, S	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	....	.....

Total Assessments levied to date, $31,809.357 Div'ds pd. to date, $87,536,400 Total sales.....124,055

Boston.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, C	Mich.	..	$1,000,000	20,000*c*	$940,000	May 9, '76. $5.	....	.....	$6 50	7 00	7 50	8 00	10 00	10 00	.....
Calumet and Hecla, C	Mich.	2¾ mile	2,000,000	80,000*d*	1,200,000	.....	$11,450,000	Feb. 15, '77, $5.	180 00	181 00	180 50	180 00	179 50	179 50	.....
Central, C	Mich.	..	500,000	20,000*c*	100,000	June, '62, 65c.	1,160,000	Feb. 6, '77, $7.	34 00	33 75	34 00	34 00	33 75	34 00	.....
Copper Falls, C	Mich.	..	1,000,000	20,000*d*	535,000	May 10, '76,	100,000	Nov., '71, $1.	3 75	3 18¾	3 00	3 12½	3 25	3 37½	.....
Dana, C	Mich.	..	500,000	20,000*d*	68,000	Jan., '73, 50c.	....	.....	10	10	10	10	10	10	.....
Dawson, S	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	13	13	13	13	13	14	.....
Duncan, S	Canada.	..	1,200,000	60,000*f*	75,000	July, '76, 41⅔.	....	.....	6 12½	6 12½	6 06¼	5 87½	5 87½	5 75	.....
Franklin, C	Mich.	..	500,000	20,000*d*	360,000	June, '68, $5.	585,000	Nov., '71, $1.	11 25	11 37½	11 25	11 37½	11 00	11 00	.....
Humboldt, C	Mich.	..	500,000	20,000*d*	100,000	Sept. 28, '76, 15c.	....	.....	20	20	20	20	20	20	.....
International, S	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	56¼	56¼	56¼	56¼	50	50	.....
Madison, C	Mich.	..	500,000	20,000*d*	123,000	Sept. 11, '74, 10c.	....	.....	25	25	25	25	25	25	.....
Mesnard, C	Mich.	..	500,000	20,000*d*	160,000	April 12, '65, 50c.	....	.....	40	40	40	41	40	40	.....
Minesota, C	Mich.	..	1,000,000	20,000*c*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 37½	1 31¼	1 25	1 37½	1 37½	1 37½	.....
National, C	Mich.	..	500,000	20,000*d*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 12½	1 12½	1 12½	1 12½	1 12½	1 12½	.....
Osceola, C	Mich.	..	1,000,000	40,000*d*	880,000	May 1, '76, $2.	....	.....	20 75	20 50	20 25	20 75	20 25	20 50	.....
Petherick, C	Mich.	..	500,000	20,000*d*	165,533	March 22, '76, 50c.	25	25	20	21½	22½	22	.....		
Pewabic, C	Mich.	..	500,000	20,000*d*	185,000	June, '68. $3.	460,000	July, '73. $1.	4 25	4 37½	4 25	4 12½	4 00	4 00	.....
Phœnix, C	Mich.	..	1,000,000	20,000*d*	817,500	Sept., '70, $3.	20,000	Jan 20, '76, $1.	....	....	....	....	....	....	.....
Quincy, C	Mich.	..	k 200,000	20,000*b*	....	.....	2,130,000	Feb. 15, '77, $4.	48 75	40 37½	40 50	40 25	40 00	40 50	.....
Ridge, C	Mich.	..	500,000	20,000*d*	200,000	.....	90,000	Feb. 8, '75, $1.	3 50	3 62½	3 75	3 87½	4 00	3 75	.....
Rockland, C	Mich.	..	500,000	20,000*d*	495,000	Jan., '74, $1.	....	.....	25	25	25	25	25	25	.....
Star, C	Mich.	..	800,000	20,000*d*	265,000	March 30, '76, 50c.	....	.....	30	30	27	25	25	25	.....
Superior C	Mich.	..	500,000	20,000*d*	340,000	March, '74, 25c.	....	.....	10	10	10	10	10	10	.....

Total Assessments levied to date, $7,640,033 Div'ds paid to date, $18,175,000 Total sales ..... —— shares

G. Gold. S. Silver. L. Lead. C. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Quotations represent the latest prices bid. Prices asked will have a * affixed. For readines of comparison the quotations of Philadelphia Stocks and the shares being $50 each, are based upon a percentage value, or 100, equal to shares of $100. *h* Full paid. *i* On the four old companies. † This company declared a dividend of 3½ per cent. on its preferred stock in July, 1876. ‡ New York Stock Exchange quotations.

capital divided into 100,000 shares of $10 each. The regular office of the company is in this city. Good and disinterested authority pronounces this one of the best mines in Colorado, and says that it is in a position to pay regular dividends even greater than are immediately promised by the company. It is to be hoped that such additional mines as may be added to the list will be of this type.

SEATON.—This stock has held the second position on the list. The transactions have aggregated 20,800 shares, and the prices have ranged from 5¾ to 5, and closed at 5. This mine has attracted considerable attention during the past two weeks. It is pronounced a good mine, although not equal in value to the Hukill, which is, however, on the same vein and capitalized at double the amount of the Seaton, which has a capital of only $500,000, divided into 50,000 shares of $10 each. This company has its regular office in this city. The management promises regular monthly dividends after the 1st prox. We shall give much fuller descriptions of these mines at an early day.

MERRIMAC.—This stock has also attracted much attention. The sales aggregate over 11,900 shares, and the quotations have ranged from 6⅞ to 6¾ and closed at 6⅞. This mine has been reported on by several well-known engineers, who state that there is a large amount of ore in sight, and that the mine, under good management, should continue to pay regular dividends.

The sales and quotations on the New York Mining Stock Eqchange during the week, omitting those stocks which are quoted on the American Mining Board, are given below. We understand that this Board have secured the Government Bond Room in the New York Stock Exchange Building, which they purpose occupying for future operations.

Lacrosse Gold Mining Company, 9,500 shares at from 20c. to 32c. per share.

Smith and Parmlee, 1,500 shares at 15c. per share

Bobtail Gold Mining Company, 500 shares at from $1.50 to $1.55 per share.

New York and Colorado Gold Mining Company, 180 shares at from $2 to $2.50 per share.

Quotations have been as follows:

Bobtail Tunnel Company, $3@$4¼.

Eureka G. V. California Gold Mining Company, $2½@$3¼, gold.

Silver Islet Silver Mining Company, 50c. bid.

The Modoc Mine of California yielded $51,315 in bullion for the month of February.

Black Bear Quartz Mining Company.—This company declared a dividend of 25c. per share from its January product, amounting to $7,500.

Consolidated Amador Mining Company.—This company declared a dividend of 25c. per share from its January product, amounting to $7,500.

Great Western Quicksilver Mining Company.—This company declared a dividend of 25c. per share from its January product, amounting to $12,500.

The Omaha Gold Mine at Grass Valley, California, are now taking out ore which assays $30 per ton. This company paid one dividend last year.

The Manhattan Silver Mine of Austin, Nevada, gave a bullion product of $84,334 during the month of February. This company declared a dividend of $1 per share from its January product amounting to $50,000.

Tybo Consolidated Silver Mine.—This mine is located in Nye County, Nevada. The February bullion product amounted to $64,298.

The Idaho Gold Mine of Grass Valley, California, produced during the month of February $40,974 in bullion. This company declared a dividend of $7.50 per share from its January product, amounting to $22,500.

The Ontario Silver Mine of Utah gave a bullion product of $116,000 in February.

The Moose Silver Mine, located on Mount Bross, in Colorado, has produced since the 1st of May, 1876, over $300,000 worth of ore. The total expenses of the mine are stated to amount to only $5,500 per month, which would leave a profit of over $200,000.

The Empire Gold Mine of Grass Valley, California, produced $20,000 from a run of twenty-four days last month independent of sulphurets. This company declared a dividend of $1 from its January product amounting to $10,000.

The Quicksilver Mining Co's. report issued late to-day shows the production for 1876 to have increased more than 50 per ct. over 1875. The cash assets at the close of the year were $550.000—more than enough to extinguish the entire indebtedness of the Company. The net earnings for 1876 were, $381,007.96 or nearly 4 per cent. on the entire capital stock of the Company. $300,000 was used in the the payment of second mortgage bonds, leaving unpaid and outstanding $400,000. The report is a very satisfactory one.

Gas Stocks.

NEW YORK, FRIDAY EVENING, March 16, 1877.

Gas stocks generally show a falling off from our quotations of a week ago. The market continues very quiet. We are reported slight transactions in the stock of the Mutual and Metropolitan Companies at our quotations.

Joplin, Mo., Gas Works.—New gas works have recently been erected in this place.

Baltimore Gaslight Company.—The coupons of this company's bonds will be paid in gold during the month. The stock of this company is weak and declining, the quotations during the past week ranging from 133 to 140 bid and asked. This is a decline of 27 per cent. within six months, equal to a depreciation of the capital stock of the company amounting to $540.000.

New York Gas Legislation.—A bill was introduced in the York State Assembly on the 12th inst., which provides for the construction of the New York City Gas Works on the same basis as that of the city of Philadelphia. It provides for the appointment of four trustees to be selected by the Mayor, who, with the Commissioner, of Public Works, will act as a board of trustees, and refers all appropriations necessary for the construction and maintenance to the approval of the Board of Apportionment. It empowers the trustees to take any waste lands belonging to the city and to manufacture gas from bituminous coal or other materials to light the city streets and parks to supply private consumers at a rate not exceeding $2.25 per 1,000 cubic feet. The bill has been prepared by Major Noah, Assistant Corporation Attorney, who is here urging its passage. It being deemed necessary to guard against any future combinations of the companies, such as was entered into last fall when the price of lighting the street lamps was raised to $36

The Municipal Gas Company.—A short time ago the Board of Aldermen adopted an ordnance authorizing any incorporated gas company to lay mains in the city, subject to such conditions as might be imposed by the Gas Commission, which consists of the Mayor, the Controller, and the Commissioner of Public Works. The Municipal Gas Company subsequently applied for the privilege, and the Commission met on the 13th inst. and granted their application, the company to subscribe to the following conditions:—1. That their manufactory or works shall be so conducted as not to create a nuisance detrimental to the public health. 2. That the gas shall be of the best quality, the illuminating power to be not less than 16 candles. 3. Gas to be supplied to the public lamps, and the lamps to be lighted, etc., at a maximum rate never to exceed $20 a year per lamp, and gas to all the public buildings at a rate not to exceed $2 per 1,000 feet. 4. If at any time during the continuance of the franchise the Commissioner of Public Works considers that gas can be furnished at less rates than the above, then the matter shall be subject to arbitration. 5. Gas to be supplied to all private consumers at a maximum rate not to exceed $2.40 per 1,000 cubic feet. 6. The city shall have a right to order the company to expend at least $10,000 a year in laying mains. 7. The company shall restore the pavements to a condition satisfactory to the Commissioner of Public Works, and in case of their neglect or failure to do so, then the Commissioner shall have the right to do the work, and charge the cost to the company. 8. The grant or franchise to the company to continue for 30 years. Mr. Franklin, the president of the company, accepted the above conditions in their behalf.

The Citizen's Gas Company of Brooklyn have decided to increase the price of gas 25c. per 1,000 feet, this rate to go into effect after the first of the current month. Considerable indignation is expressed among the consumers who are supplied by this company, and no doubt the result will be favorable to oil and lamp dealers, as in the prevailing cycle of economy in expenditure necessitated by reduced incomes, the long-suffering customers of the Citizen's Gas Company will be likely to give oil a trial.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '77	103	104
" Bonds	90,000	1,000	†3½	Feb. '77		107
NewYork, "	4,000,000		5	Nov. '76	130	131
Metropol. "	2,500,000	100	5	Sep. '76	140	144
" " Certf.	1,000,000	....	3½	"	102	—
" " Bonds	500,000	1,000	3½	Dec. "		102½
Harlem "	1,850,000	50	4	Feb. '77	104	—
Manhattan"	4,000,000	50	10	Dec. "	218	221
Brooklyn, B'klyn..	2,000,000	25	5	Nov. '76	168	172
Nassau "	1,000,000	25	4	Jan. '76	80	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,500,000	10	3½	Jan. '76	47	52
" " Certf.	300,000	1,000	3½	July '76	84	90
" " Bds	325,000	....	3	Feb. '77	90	96
Metropol. "	1,000,000	10	3½	Nov. '76	78	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	100	102
Citizen's "	1,200,000	20	2½	Jan. '76	95	99
" " Certf.	320,000	1,000	3½	Oct. "	98	102
J. C. N.J.....	750,000	20	5	July,'75	160	—
Centl.Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	295,000	50	3 ½	Oct.1,'76	90	100

† Gold.

FIRE BRICK.

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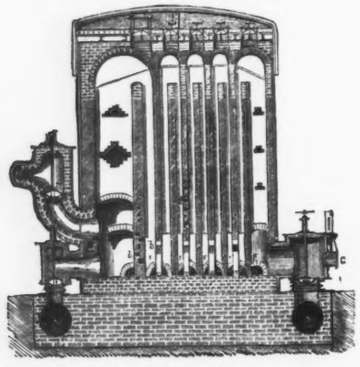

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